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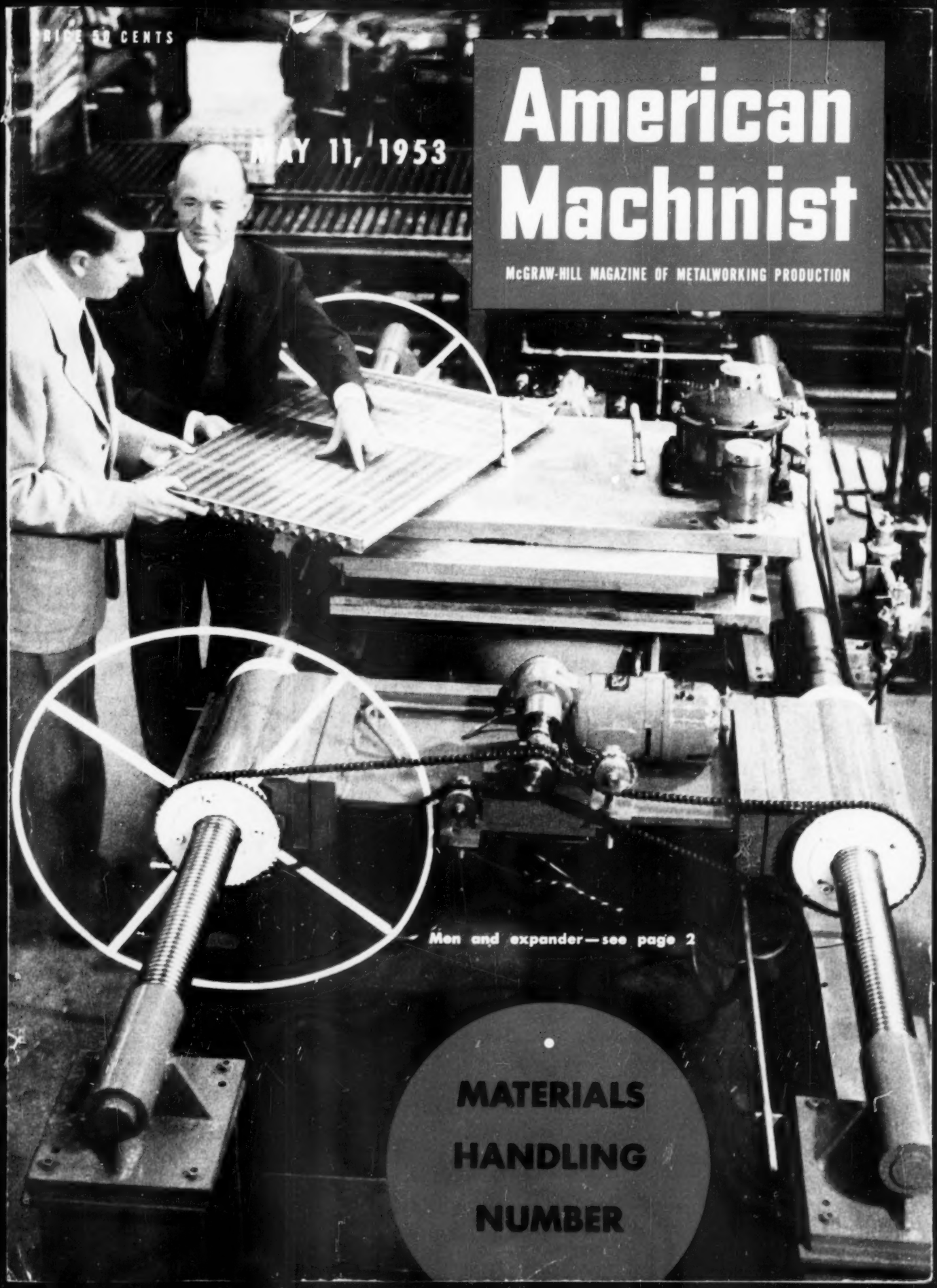
MAY 11, 1953

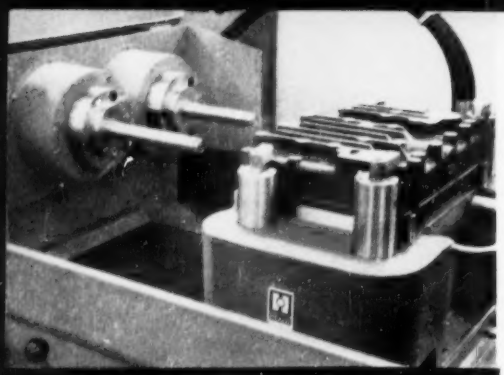
American Machinist

McGRAW-HILL MAGAZINE OF METALWORKING PRODUCTION



Men and expander—see page 2

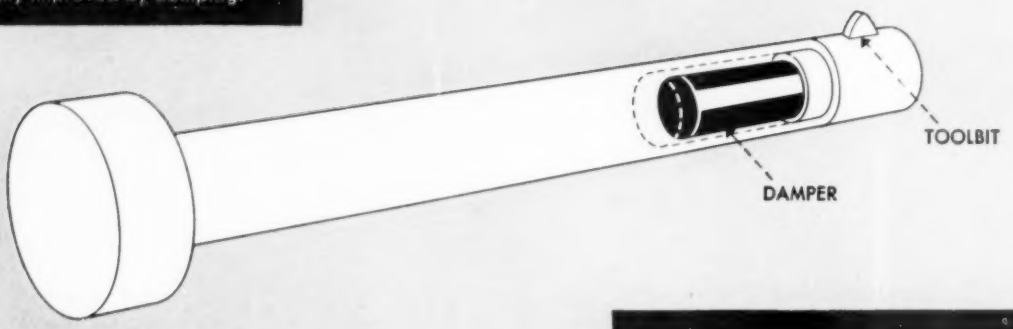
MATERIALS HANDLING NUMBER

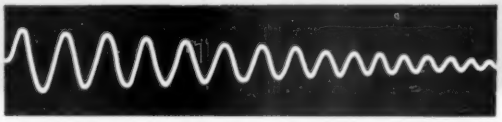


Long valve body holes are successfully bored, two at a time, with damped quills on this Heald Bore-Matic setup. Surface finish is materially improved by damping.

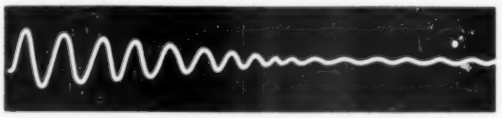
How Inertia Damping

PREVENTS QUILL CHATTER





Oscillograph record showing normal rapidity with which quill vibration tends to die out.



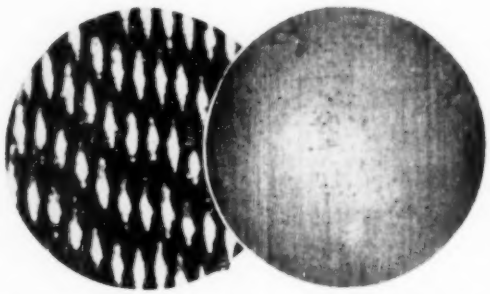
Oscillograph record showing how vibration in a properly damped quill decreases much more rapidly.

• Self-excited vibration in relatively long boring bars often presents a serious problem—particularly where a fine finish is required.

Heald's answer to this problem is the damped quill—a method of vibration control which has proved both simple and remarkably effective in a great many cases.

The damping effect is obtained by means of a plug of heavy material, inserted in the bored-out end of the quill. Being slightly smaller than the bore, the damper plug "floats" in its enclosure as the quill rotates, and its inertia tends to oppose or cushion any vibratory movement of the quill itself. The effectiveness of the damped quill is well illustrated by the microphotographs and oscillograph records shown at the right.

If you have a problem of self-excited quill chatter, ask your Heald representative for the complete damped quill story—or write for our special folder on damped quill applications. Remember—when it comes to precision finishing, it pays to come to Heald.



Above, at left, is a photograph, magnified 8 times, showing a chattered work surface before damping. At right, with same magnification, the surface finish has been obviously improved by damping the quill.

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INTERNAL AND ROTARY SURFACE GRINDING MACHINES AND BORE-MATICS

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American Machinist

MAGAZINE OF METALWORKING PRODUCTION

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American Machinist is indexed regularly in the Engineering Index and the Industrial Arts Index

Chips and QUIPS

Men and Machines . . . A hydrostatic coil-expansion machine designed by engineers of the Manufacturing Laboratory, Carrier Corporation, Syracuse, is shown in our cover picture. With it are two men particularly concerned with its operation. Facing the camera is J. L. McLaughlin, plant manager, Unitary Equipment, who has been in Metalworking for 37 years and associated with coil making since 1932. *American Machinist* has, incidentally, been a part of his industrial life for as far back as he can remember. He still spends at least a couple of hours each day out in the various shops and facilities under his management, and for the past seven years has devoted considerable time to teaching the man with his back to the camera (see biog below), "Don" Pennock, engineering and production fundamentals of Carrier's business.

The machine assembles copper tubing to plate fins by expanding the tubing into fin holes. It differs from other machines for the job in that it utilizes motorized carriages riding on twin Acme-threaded shafts. More than 3 tons of hydraulic thrust is on the center line of the twin shafts so that no bending moment is introduced into the machine frame. Plate fins, tubes, and tube sheets are assembled in the "nest" (below the assembly) in this position, then are lowered to pressure position by a hydraulic piston. Shaft length permits coils from 20 to 72 in. long to be expanded in this machine.

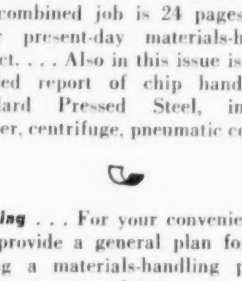
In the background is one of the many conveyors in use at Carrier. More are in our lead article on coil making.

Chips . . . Our current Special Report became somewhat of an omnibus. Noting the recent great increase in chip-handling facilities, we decided to make a roundup on the subject. Then we felt that recent great developments in cutting-fluid filtration should be added. The combined job is 24 pages and a major present-day materials-handling subject. . . . Also in this issue is a more detailed report of chip handling at Standard Pressed Steel, including crusher, centrifuge, pneumatic conveyor.

Planning . . . For your convenience, we also provide a general plan for establishing a materials-handling program or department and integrating it with present management. There's a chart of major MH items, properly classified, and a list of department functions.

Conveying . . . Several articles in this issue have to do with materials handling of various types. First, there's the Show in Print, describing new items at the forthcoming Materials Handling Show that we haven't previously described. . . Then there are four articles on specific materials-handling jobs, drawn from all over the country . . . First is the Douglas Aircraft system of 6X3-ft overhead carriers (the biggest yet), to avoid congestion on the floor. Carriers have built-in rollers for ease in handling loads, can be dispatched automatically to any point in 10 departments. Savings are already over $10,000 a year and 40% of parts are handled on it. An extension is planned. . . . Western Electric, at Indianapolis, has conveyorized telephone making on 2½ miles of overhead units. Automatic dispatching is used here too, through graphite dots sprayed on cartons. Also, 550 tons of plastic powder are conveyed pneumatically from 44 outdoor tanks, and acids are transported in special tanks on fork trucks. . . . Sheffield also has a dispatching conveyor in its Parts Div, handles 60% of parts that way at big savings. . . . Then from Ryan Aeronautical, we show pictures of various job-shop handling setups.

Coming . . . May 25 *AM* will have a 10-page Special Report showing selected operations at Reed Roller Bit in Houston, on products' unfamiliar to most readers—oil-well drilling tools. There'll also be the first of four articles on some important machinability data, plus articles on making metal TV tubes, on axle turning, flanging and a pair giving advice to management.



MATERIALS HANDLER . . . Donald W. Pennock, who has his ME from the University of Kentucky, is factory engineer in charge of material-handling engineering at Carrier Corporation, Syracuse, N.Y., where he has been since 1945. He was previously with General Motors, Wright Aeronautical Corporation, and Schenley Corporation. A registered professional engineer in Ky., Ind. NJ, he is a member of the ASME, SAME, American Materials Handling Society, and Natl Society of Professional Engineers. He is also on the AMA Packaging Council and currently president (since 1950) of AMHS. He authored our current lead article on the coil shop at Carrier.

ONE CUT
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16 D. P. and Finer

- Gleason No. 2 Straight Bevel Generator
- Complete Precision Gears in one Operation
- Features Interlocking Multi-blade CONIFLEX® Cutters
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UNIQUE SET-UP

Automatically End-Mills Radius

. . . improves finish and production

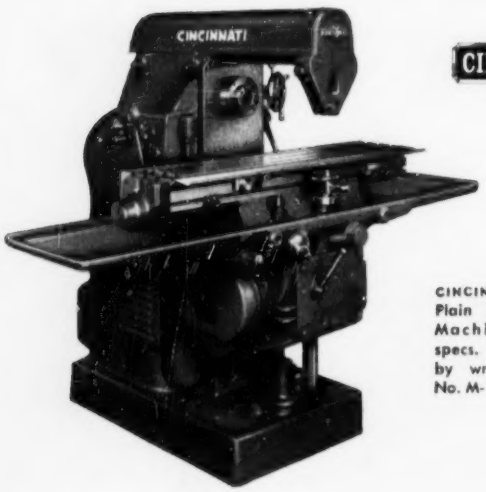
PRODUCTION DATA:

Part name . . . . . Fitting
Material . . . . . Cast iron
Operation . . . . . Mill 2¼" radius
Cutting speed . . 395 feet/min.
Feed . . . . . 6¾ inches/min.
Depth of cut . . . ⅛"
Cutter . . . . . 5" diameter, sintered carbide teeth
Production . . . . . 51 per hour

Principle of operation. Heavy line indicates milled surface.

A high-quality finish on the radius end of cast iron fittings was a stumbling block to production until Cincinnati Application Engineers studied the job. Their analysis indicated that the work could be machined to advantage by the milling process, on a standard CINCINNATI No. 1-18 Plain Automatic equipped with two rotary attachments. ¶The two attachments are arranged in tandem, driven from an electric motor through V-belts and a four-step pulley to give a selection of four rotary feed rates. The cycle is completely automatic, started with a single lever, milling one part while the other fixture is being loaded. Safety is engineered into the equipment through an ingenious arrangement of limit switches which engage a solenoid operated interference to the starting lever, preventing it from being accidentally moved while the cycle is progressing. Other limit switches retract the starting lever interference and stop the fixture motor after the cut has rotated through 180°. ¶Both large and small shops can benefit from the low-cost production possibilities of CINCINNATI No. 1-18 Plain Automatics. Their fast two-way automatic cycle (300 inches/min. rapid traverse) keeps production going at a high rate . . . their automatic backlash eliminator is highly desirable for down-milling and reciprocal milling set-ups . . . table ways directly on top of knee provide extra rigidity . . . pick-off gears and other features of low set-up time bring automatic production within reach of the small lot manufacturer. Would you like to know more about these small low-cost producers of high-quality milling operations? Brief specifications will be found in Sweet's Machine Tool Catalog file. For complete data, write for publication No. M-1555-2.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO



CINCINNATI No. 1-18 Plain Automatic Milling Machine. Complete specs. may be obtained by writing for catalog No. M-1555-2.

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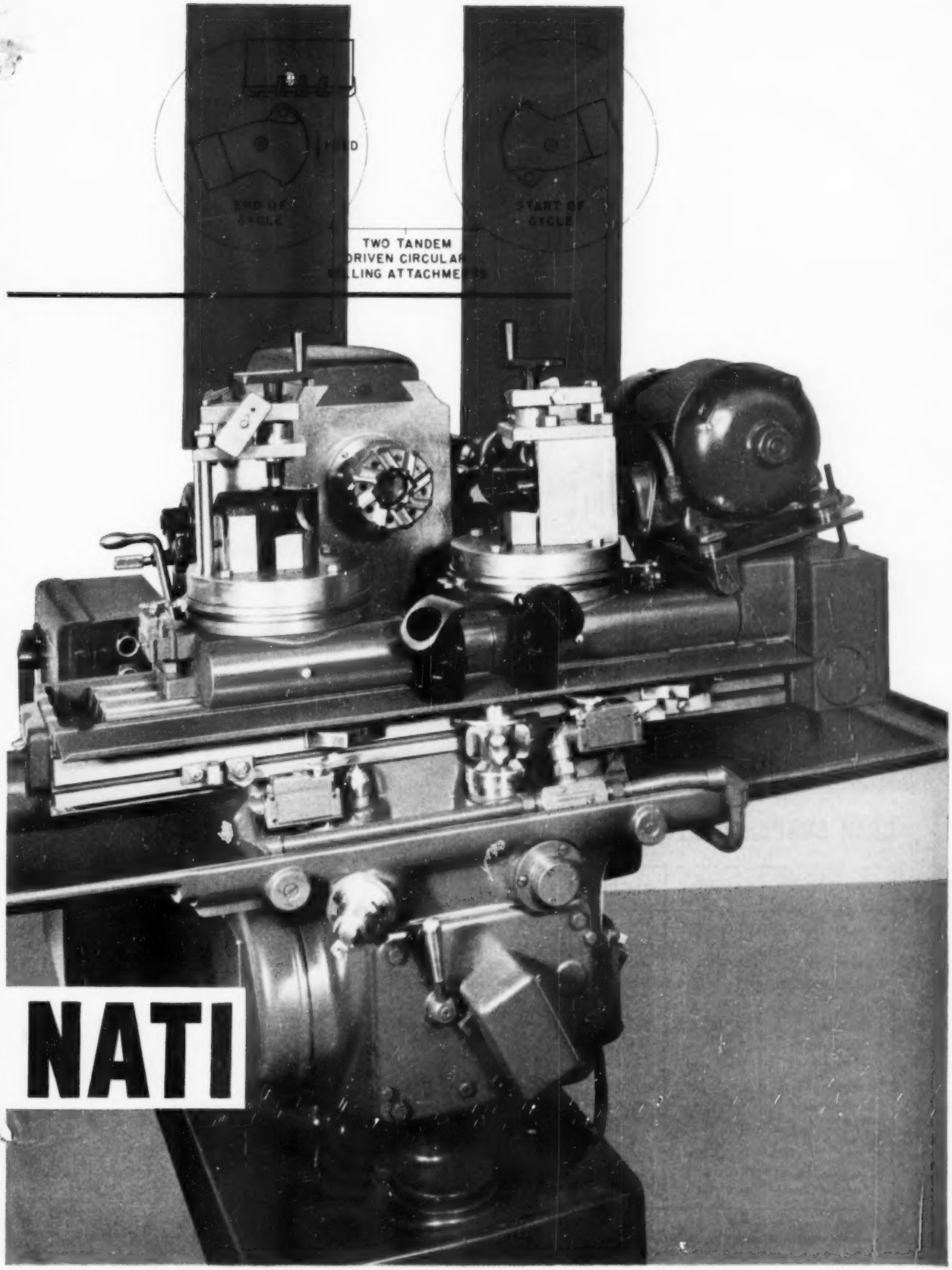
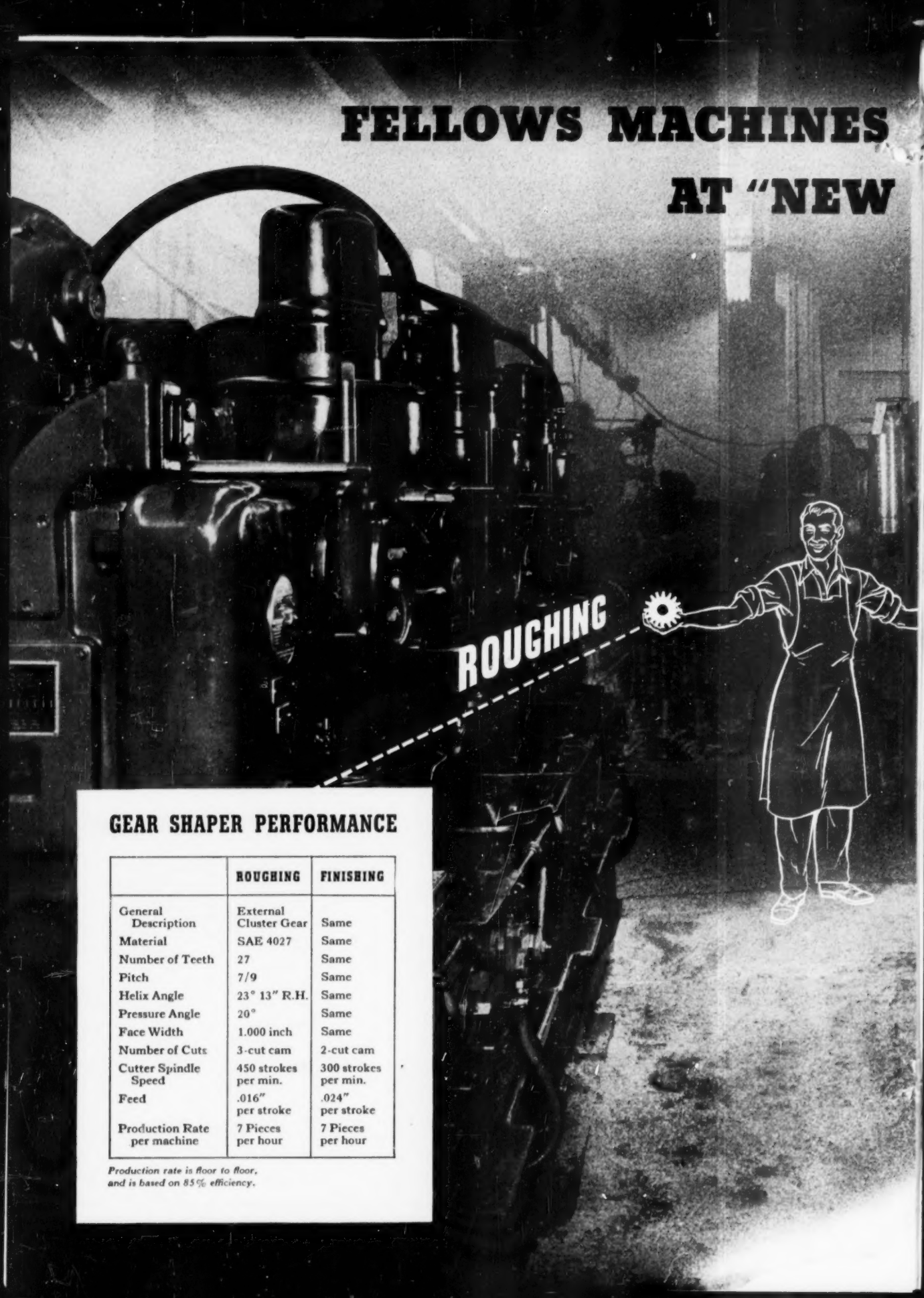


NATI

FELLOWS MACHINES AT "NEW

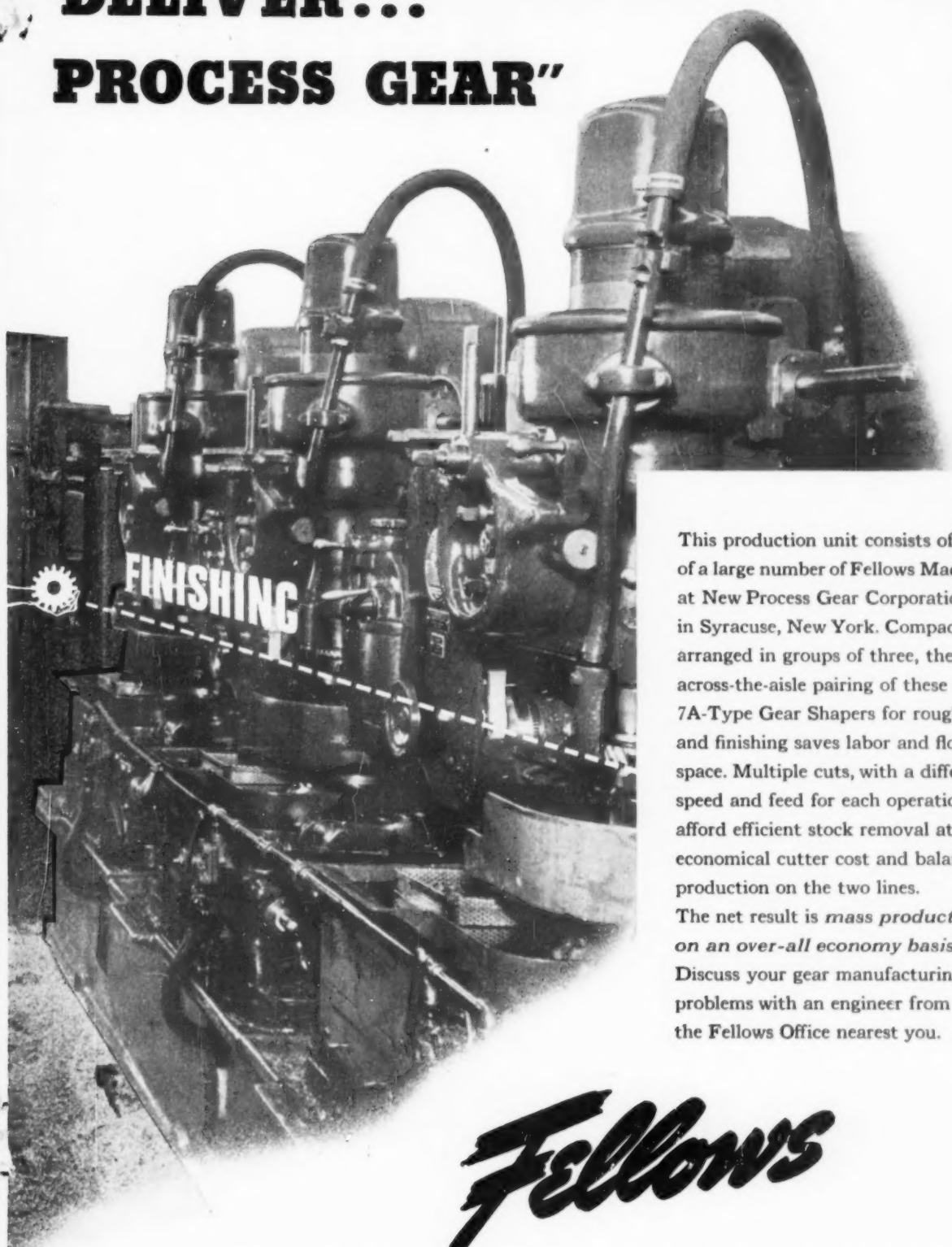


GEAR SHAPER PERFORMANCE

	ROUGHING	FINISHING
General Description	External Cluster Gear	Same
Material	SAE 4027	Same
Number of Teeth	27	Same
Pitch	7/9	Same
Helix Angle	23° 13" R.H.	Same
Pressure Angle	20°	Same
Face Width	1.000 inch	Same
Number of Cuts	3-cut cam	2-cut cam
Cutter Spindle Speed	450 strokes per min.	300 strokes per min.
Feed	.016" per stroke	.024" per stroke
Production Rate per machine	7 Pieces per hour	7 Pieces per hour

Production rate is floor to floor, and is based on 85% efficiency.

DELIVER...
PROCESS GEAR"



This production unit consists of 6 of a large number of Fellows Machines at New Process Gear Corporation in Syracuse, New York. Compactly arranged in groups of three, the across-the-aisle pairing of these six 7A-Type Gear Shapers for roughing and finishing saves labor and floor space. Multiple cuts, with a different speed and feed for each operation, afford efficient stock removal at an economical cutter cost and balanced production on the two lines.

The net result is *mass production on an over-all economy basis.*

Discuss your gear manufacturing problems with an engineer from the Fellows Office nearest you.

Fellows

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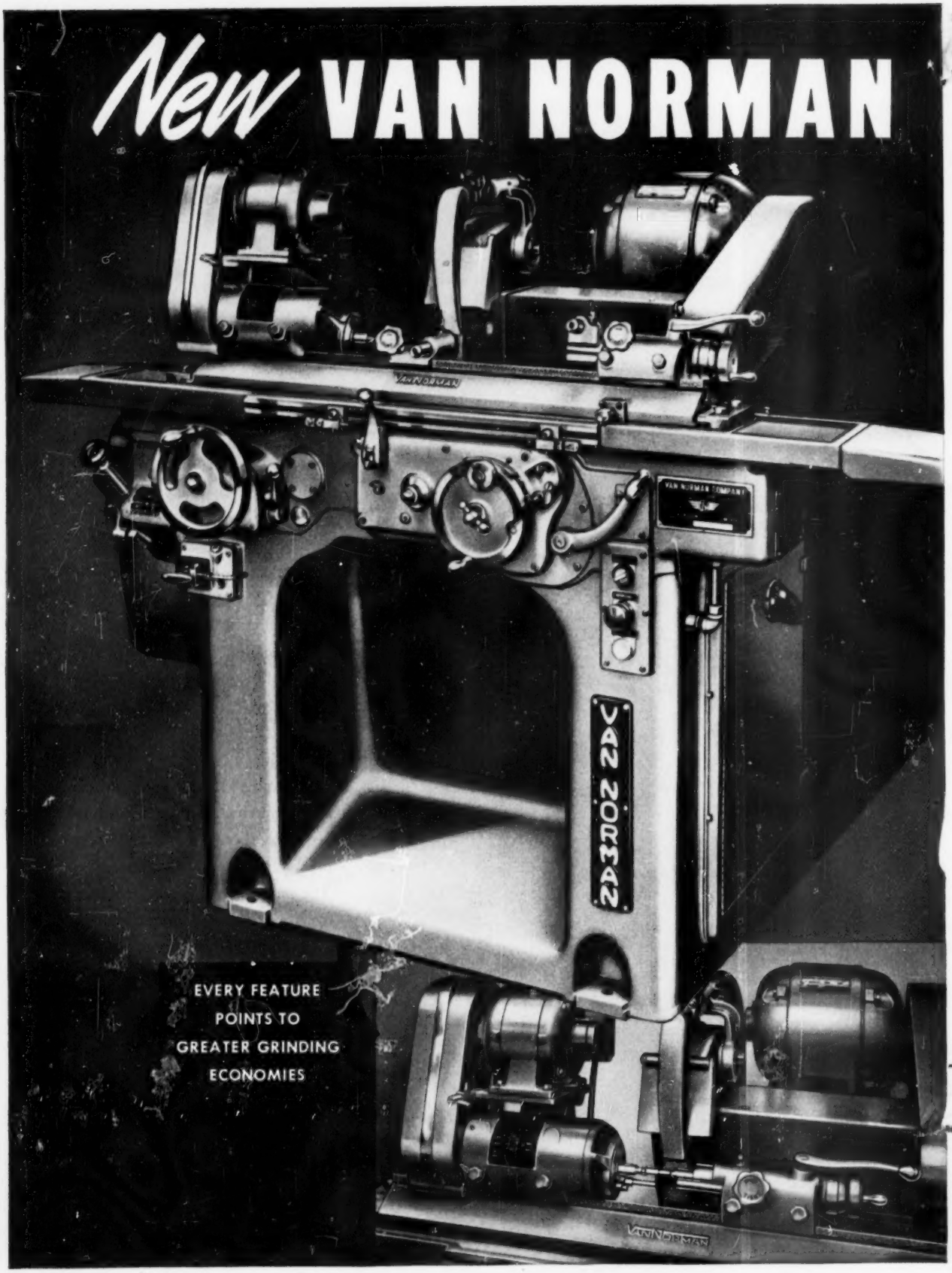
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EVERY FEATURE
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GREATER GRINDING
ECONOMIES

418 Cylindrical Grinder

Engineered to Save Time...Reduce Costs Of Short-Run or Production Grinding of Small Parts!

Here's the *new* Van Norman Cylindrical Grinder that is making history in fast precision traverse or plunge grinding of small parts. Quick to set-up, easy to operate, this grinder cuts grinding costs in toolrooms, job shops or machine shops.

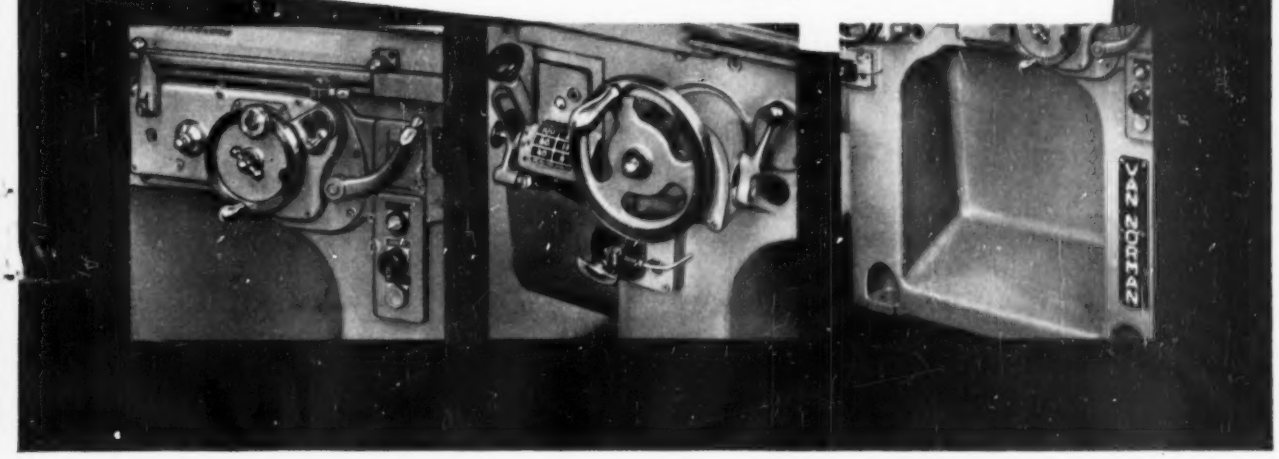
The 418 Grinder is especially designed for ease of operation. Recessed base design permits operator to sit or stand comfortably at the machine. Heavy-duty quality construction throughout assures smooth accurate finish.

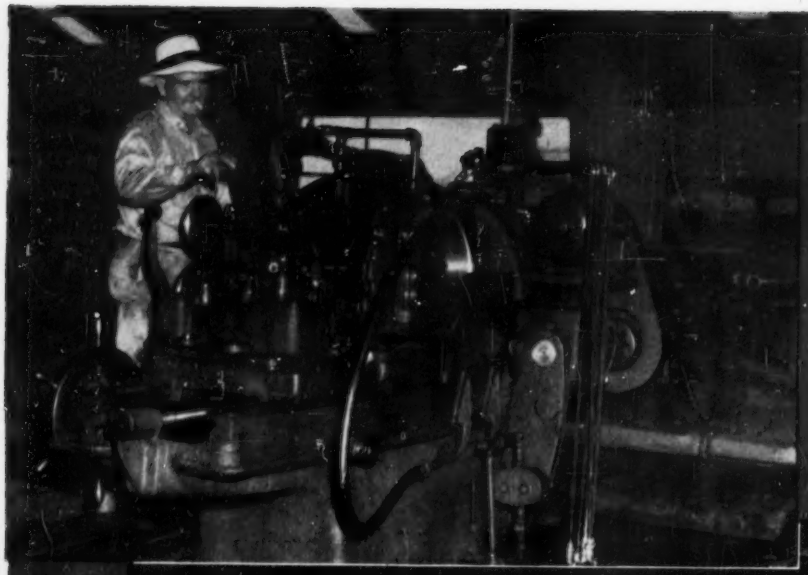
COMPARE THESE ADDITIONAL ADVANTAGES

- *Pope wheel spindle equipped with heavy-duty SKF double row cylindrical roller bearings.*
- *Single lever control for rapid traverse and plunge grinding*
- *Rugged base, wide table bearing ways, separate motor drives for wheel spindle, table and headstock*
- *Minimum floor space needed, only 43½" x 79¼"*

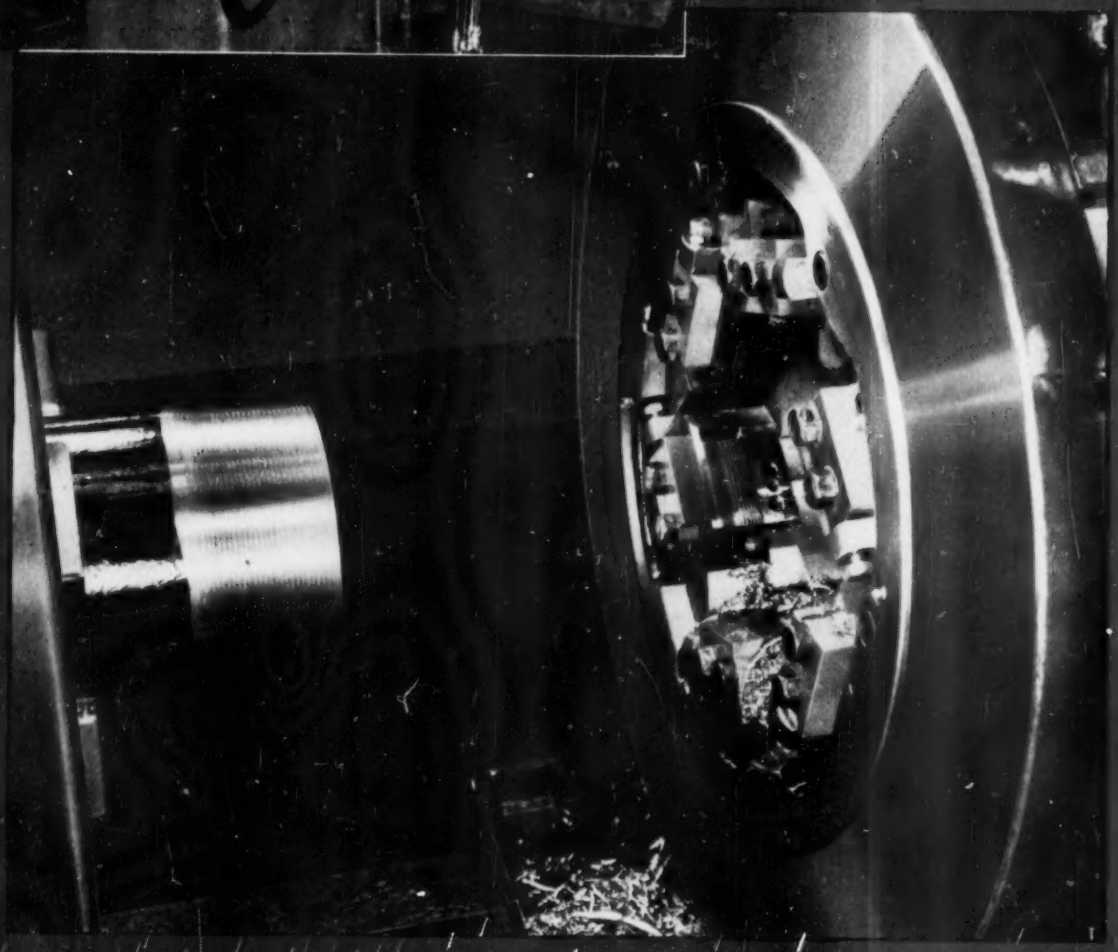
Find out how you can increase production output of grinding small parts. Ask about the price, too...*it's exceptionally low* for such a high quality machine. Write:

VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS, U. S. A.





LARGE PIPE



SEE THESE MACHINES AT THE TULSA OIL SHOW

WORLD'S LARGEST MANUFACTURERS OF THREAD GENERATING EQUIPMENT

TEXAS SHOP USES LANDIS MACHINES *Exclusively*

TEN LANDIS Receding Chaser Pipe Threading Machines are used by Atlas Pipe, Inc., largest mill-type pipe finishers on the Gulf Coast, for threading oil tubular goods.

These machines are installed in an offset position so as to permit uninterrupted production. Typical production figures show: the 4¾" machines threading 74 joints (148 threads) per hour from 2⅜" upset tubing—the 8⅝" machines averaging 20 joints (40 threads) per hour from 5½" casing. All threads are 8 pitch to API standards.

Mr. Becker, Plant Manager, highlights the important production advantages of LANDIS Pipe Machines when he says that they were selected for their flexibility, versatility, and the uniform threads produced. Thread uniformity is made possible by massive construction, leadscrew control of the carriage movement, a precision-built die head featuring LANDIS Tangential Chasers, and an attachment which mechanically controls the degree of taper.

These machines offer flexibility through wide range coverage—three sizes of machines (4¾", 8⅜", 13⅝") thread all pipe sizes from 1⅝" to 13⅜". Special chaser holders allow threading of sizes below that range. Ease of set-up is also important—a change of diameter and length in less than two minutes, a complete change for diameter, pitch, taper, and length in 40 minutes.

LANDIS Receding Pipe Machines perform four other pipe fabricating operations in addition to threading: cutting off, chamfering, reaming, and the making and breaking of collars. For more complete information, please ask for Bulletin C-77.

50th ANNIVERSARY

LANDIS *Machine* COMPANY

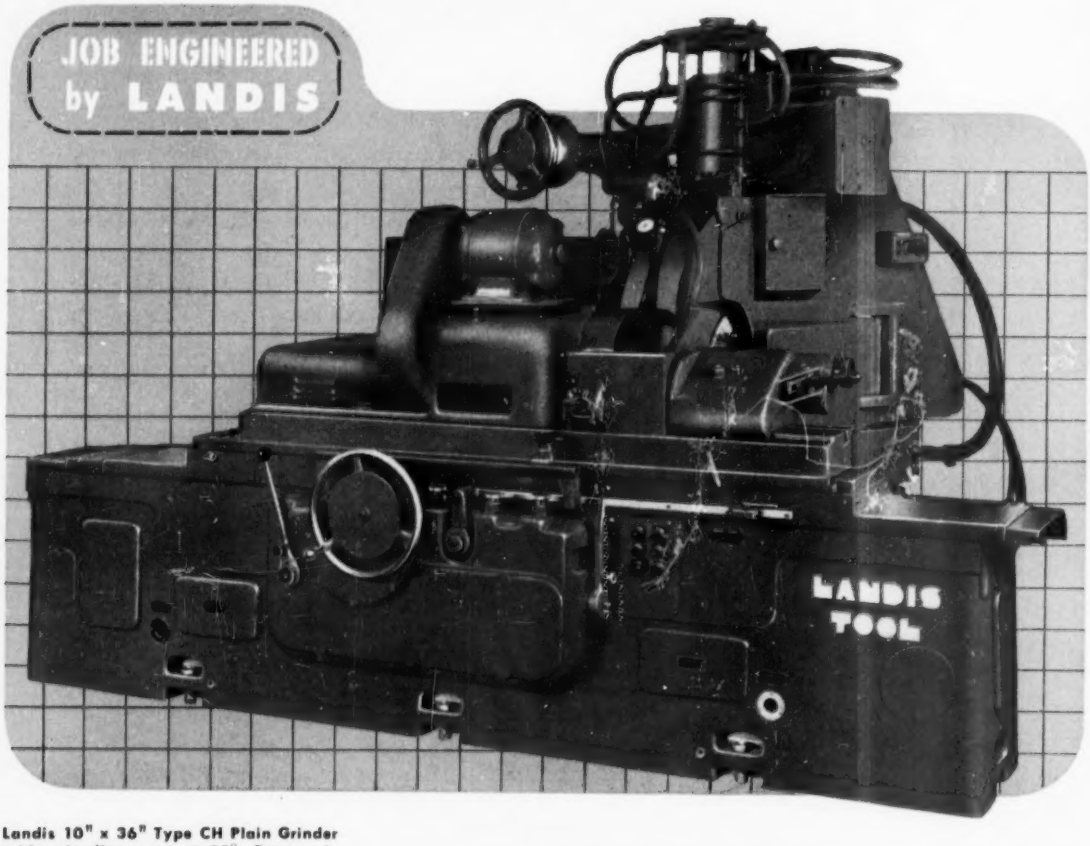
WAYNESBORO • PENNSYLVANIA • U. S. A.

MAY 14-23, BOOTHS 17-18, CALIFORNIA BUILDING

How LANDIS JOB ENGINEERING cuts grinding costs...

Angle wheelbase grinder gives fast return on investment...

Grinds diameters and adjoining face in one operation



Landis 10" x 36" Type CH Plain Grinder with wheelbase set at 30°. Dresser is overhead type, hydraulically operated for profile dressing of wheel.

JOB ENGINEERED by LANDIS means grinding ideas that will produce the highest return on your investment —fast! It starts with operator convenience, hydraulic operation and simplified maintenance of a standard grinder. Then, on the basis of your requirements of finish, tolerance and production, we will suggest tooling such as these angle wheelbase jobs that will increase output with no loss in precision or finish.

Landis Job Engineered Grinders give you fast return on your investment because they're engineered to your requirements. Send us your prints for tooling suggestions and production estimates. No obligation.

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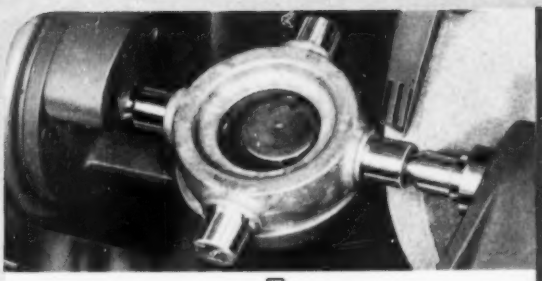
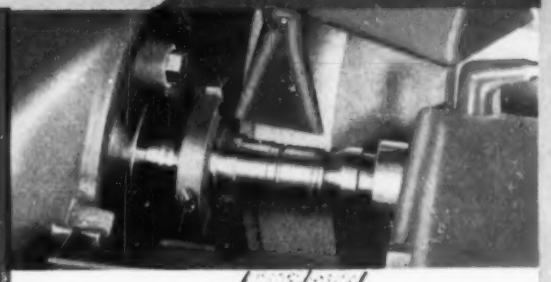
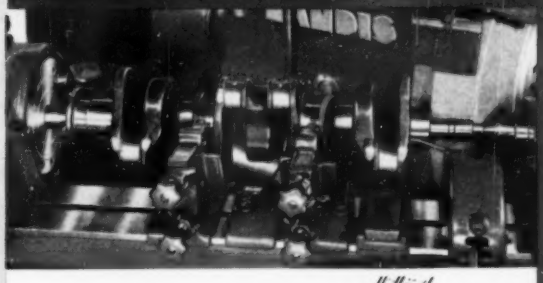
LANDIS

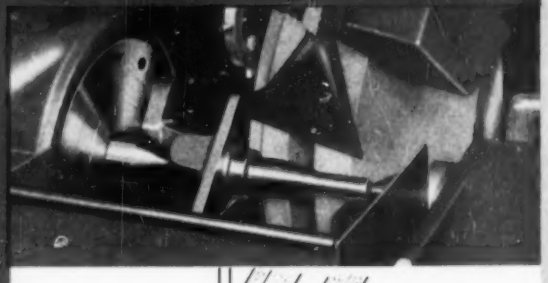
precision grinders

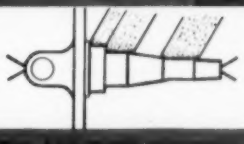
JOB ENGINEERED
by LANDIS

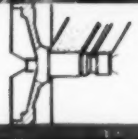


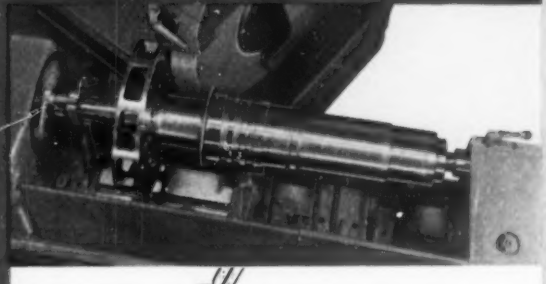


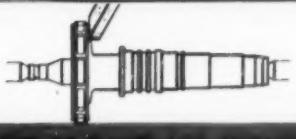




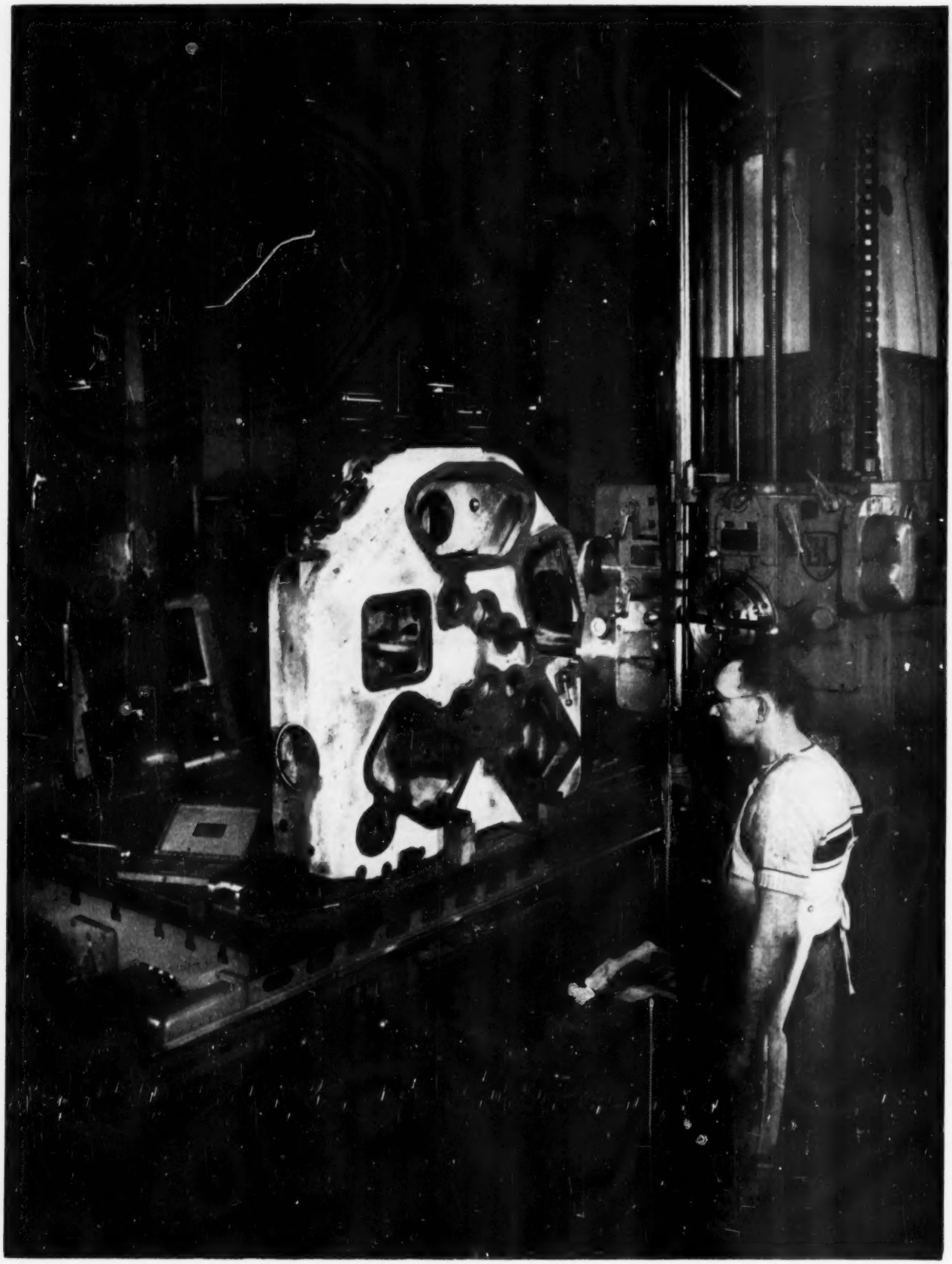








LANDIS TOOL COMPANY • WAYNESBORO, PENNSYLVANIA, U. S. A.



Bullseye!...

on the mark within .0002"

Here's precision, speed and versatility to perform boring, drilling and milling operations with equally high efficiency. Here's capacity to handle large or small work, simple or complex set-ups, long or short runs. Here's the 350-T, another superlative G&L Horizontal Boring, Drilling and Milling Machine

As one enthusiastic production engineer put it, "We've found our G&L horizontal bar furnishes faster cutting speeds, heavier cuts, better finishes, greater efficiency and improved operating economy. Its 45 speeds and 36 feeds are so well designed that the machine provides excellent performance for an overall range of milling, drilling and boring practices."

Here briefly are some of the features of this 25 hp, 5" spindle, table-type machine — choice of three basic arrangements of table and saddle; hardened, heavy-duty ways on bed and saddle; rapid, easy speed selection; bed lengths from 96" to 144"; column heights from 48" to 72"; and cross travel ranging from 72" to 120" with saddle supports.

What's more, these versatile machines can be equipped with the G&L Automatic Electric Positioning Device. This unit eliminates many time-consuming hours for final hand adjustments for locating work. That's because it automatically controls table and headstock movements to precise, pre-determined settings.

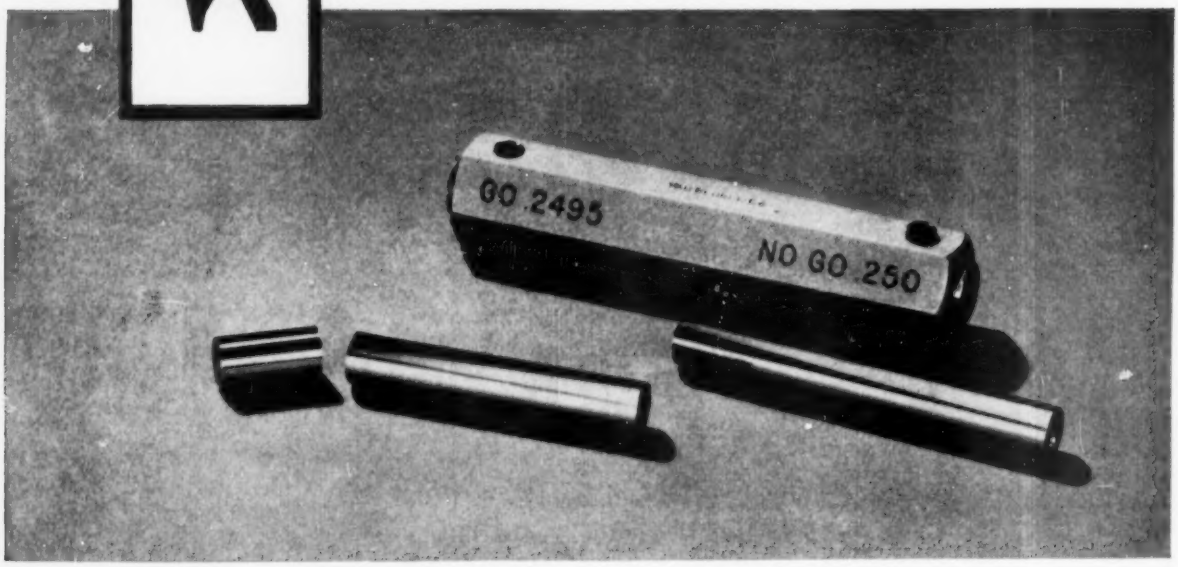
For complete information, see your G&L representative or write ———

GIDDINGS & LEWIS MACHINE TOOL CO.
FOND DU LAC, WISCONSIN

Builders of the world's finest heavy-duty Horizontal Boring, Drilling and Milling Machines — table, floor and planer types; Hypro Double Housing and Open Side Planers, Planer Type Milling Machines and Vertical Boring Mills; and Davis Cutting Tools.

Photo courtesy of Greenlee Bros. & Co.

VK WIRE TYPE PLUG GAGES



VASTLY LONGER-LIVED *and* MONEY-SAVERS . . .

because they're "Cut-Off-Able" as well as "Reversible"

As a Van Keuren agent put it, "They're not only reversible, they're cut-off-able." And that means when you buy Van Keuren Wire Type Plug Gages, the sizes below 3/8" may be cut off when ends become worn and as many as from five to ten gages made available from the 1⅞" and 2" long units. It is not only economical and practical to use Van Keuren Gages but it is a very simple operation to cut off the ends by following instructions furnished on request. The illustration above shows clearly the cut-off and reversible features.

VK Wire Type Gages are available in ZZ to XX accuracies in sizes from .001" to 1.000". They are furnished in alloy tool steel, high speed steel, chromium plate or tungsten carbide. Whatever the gaging job, the extra length provided in VK units will save you money. It will also pay you to take advantage of VK deliveries. In many cases we can ship your requirements from stock.

VK Wire Type Plug Gages are fully described in Catalog & Hand Book No. 35, available on request by writing to: The Van Keuren Co., 173 Waltham St., Watertown, Mass.

VK

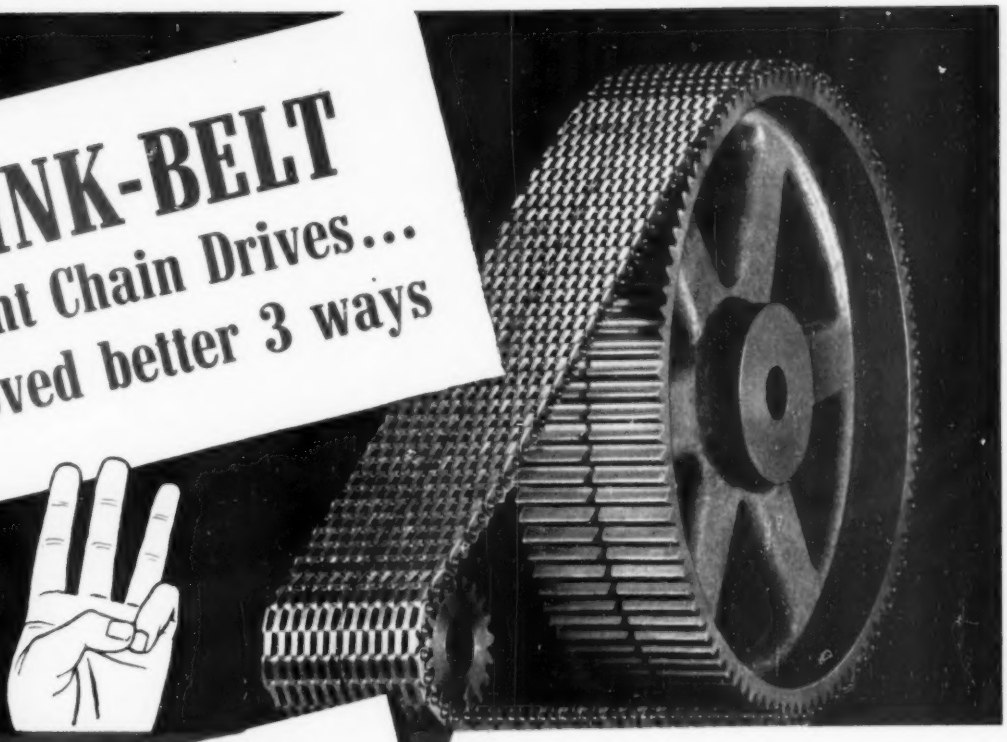
34th YEAR

THE Van Keuren CO.

173 WALTHAM STREET, WATERTOWN, MASS.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carboloy Cemented Carbide Plug Gages • Carboloy Cemented Carbide Measuring Wires

LINK-BELT
Silent Chain Drives... proved better 3 ways



LOW initial cost

LOW operating costs

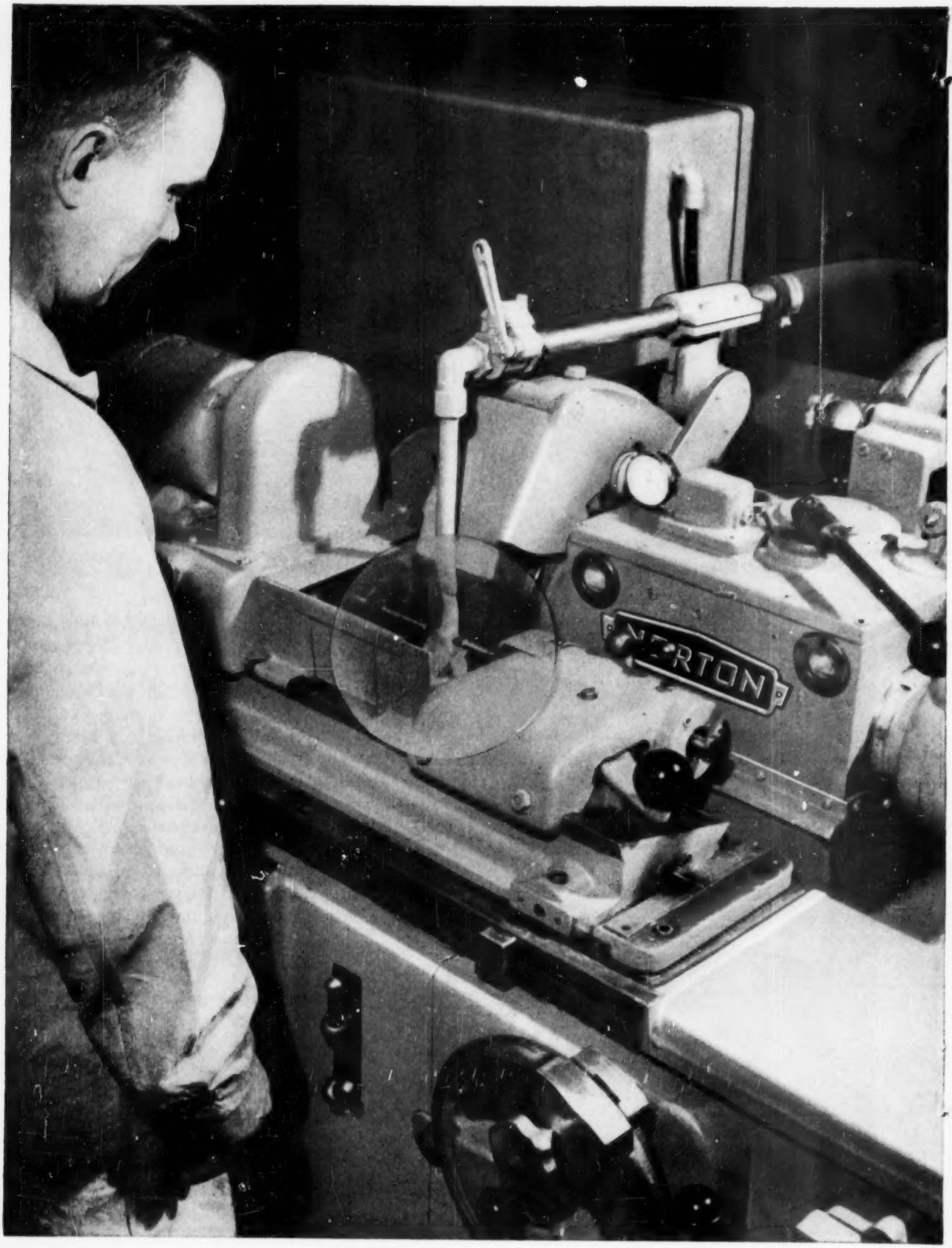
HIGHER motor speeds

WANT to transmit power at high speeds . . . *with better than 98% efficiency for the life of the drive?* With Link-Belt Silverstreak Silent Chain you get lower initial cost on many applications . . . lower operating costs in all cases. In addition, ability to operate at higher speeds means less investment in motors and controls. Efficient operation on extremely short centers saves space, too. Remember, you can get positive, no-slip Link-Belt Silent Chain Drives from fractional to thousands of hp, with drives from ½ to 50 hp available from stock. Ratios range from 1:1 to 7:1. Contact your nearby Link-Belt office or distributor today.

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

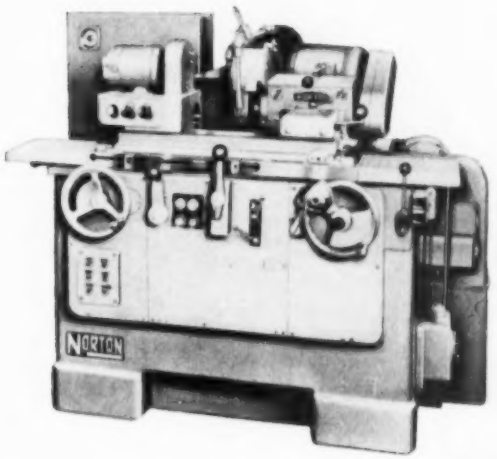
LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia).
Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13,241


NORTON

SMALL PARTS PAY OFF BIG . . . WITH THIS

"TOUCH OF GOLD"

The new Norton 4" type CTU Cylindrical Grinder gives you high precision plus high production



Here's a cylindrical grinder you can get as either a Plain Machine for traverse work, or as a Semiautomatic for plunge operations — in 12" or 18" work length capacities in both models.

Either way you'll get the added "Touch of Gold" by faster, more accurate, more profitable grinding of a wide variety of small parts. Because either way the 4" Type CTU's Norton-developed features bring a new ease of operation for your men — and a new high in production quality and quantity for *you*.

To name just one of these advanced features, there's the extremely rugged wheel spindle unit that assures enduring precision in jobs ranging from heavy stock removal to fine finishing. But why not get the whole story of this speedy, profit-boosting grinder from your Norton Representative?

Write for Catalog No. 531. And remember: only Norton offers you such long experience in both grinding wheels and machines — your assurance of the value-adding "Touch of Gold" that means better products at lower cost. NORTON COMPANY, Worcester 6, Mass.

To Economize Modernize With **NEW**

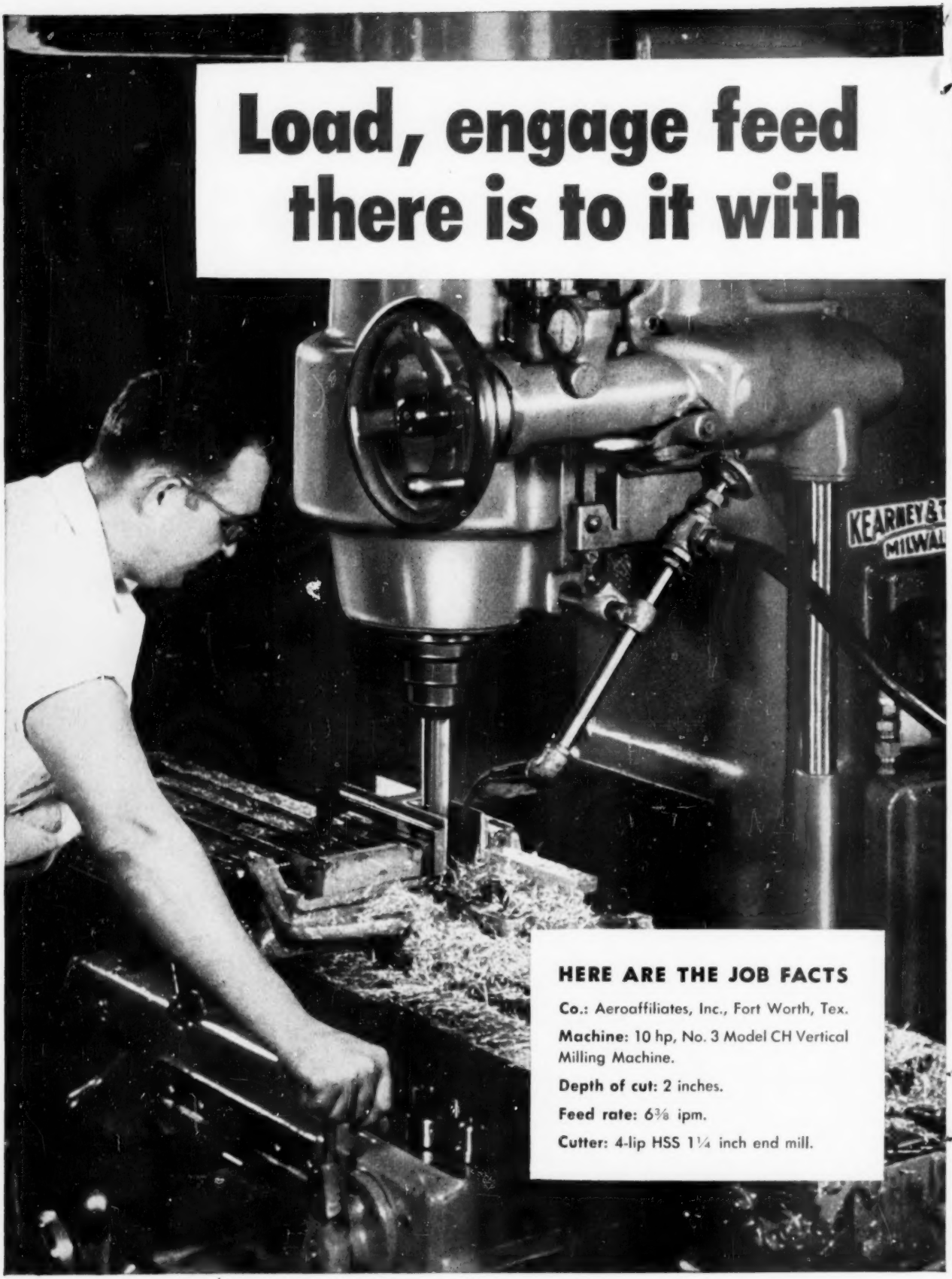
NORTON

GRINDERS and LAPPERS

Making better products to make other products better

District Sales Offices: Hartford • New York • Cleveland • Chicago • Detroit • *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5, Ontario

Load, engage feed there is to it with



HERE ARE THE JOB FACTS

Co.: Aeroaffiliates, Inc., Fort Worth, Tex.

Machine: 10 hp, No. 3 Model CH Vertical Milling Machine.

Depth of cut: 2 inches.

Feed rate: 6⅜ ipm.

Cutter: 4-lip HSS 1¼ inch end mill.

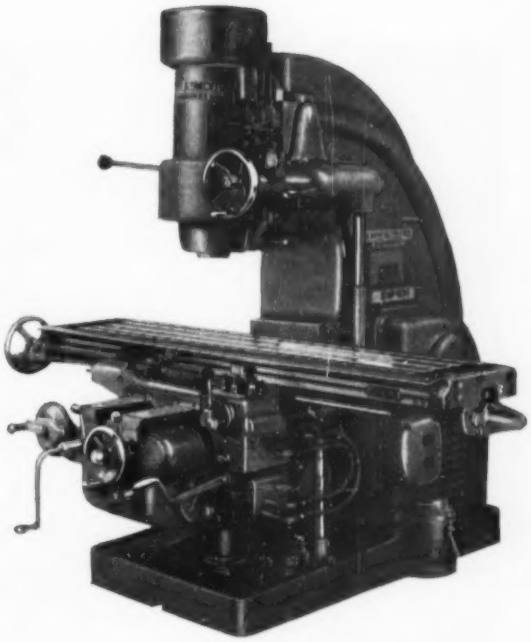
and unload—that's all this CH miller!

Aeroaffiliates of Texas select Kearney & Trecker's 10 hp No. 3 Model CH Vertical Milling Machine with *Mono-Lever and Automatic Cycle Table Control*, to speed up milling of aircraft parts and reduce operator fatigue!

TO finish-mill aluminum vertical beam fittings, this manufacturer put production on an almost automatic basis without sacrificing accuracy. He's handling the job on a 10 hp, No. 3 CH Vertical Milling Machine equipped with Mono-Lever and Automatic Cycle Table Control.

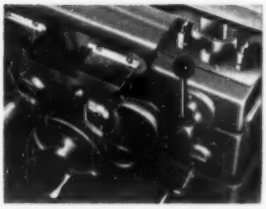
Now, after the original setup, all the operator does is load the machine, engage the feed and unload. Production is up, accuracy is maintained and operating conditions have been greatly improved to the reduction in operator fatigue.

Check this great CH line of machines for yourself. See how you, too, can cut costs, increase productivity, improve safety, get better finished products. Contact our representative or write Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

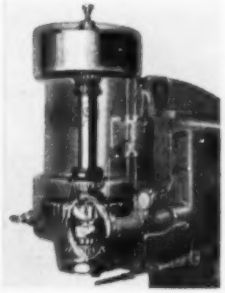


10 hp, No. 3 Model CH Vertical Milling Machine

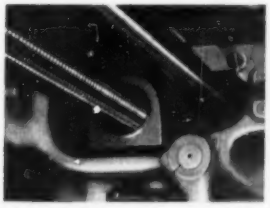
CH Milling Machine features that helped increase output — cut cost per piece



Greater Operating Convenience through Mono-Lever control facility (optional at extra cost) for table feed and rapid traverse. Also, rapid-set micrometer dials — with new vapor blasted, satin finish for greater legibility to avoid setting errors.

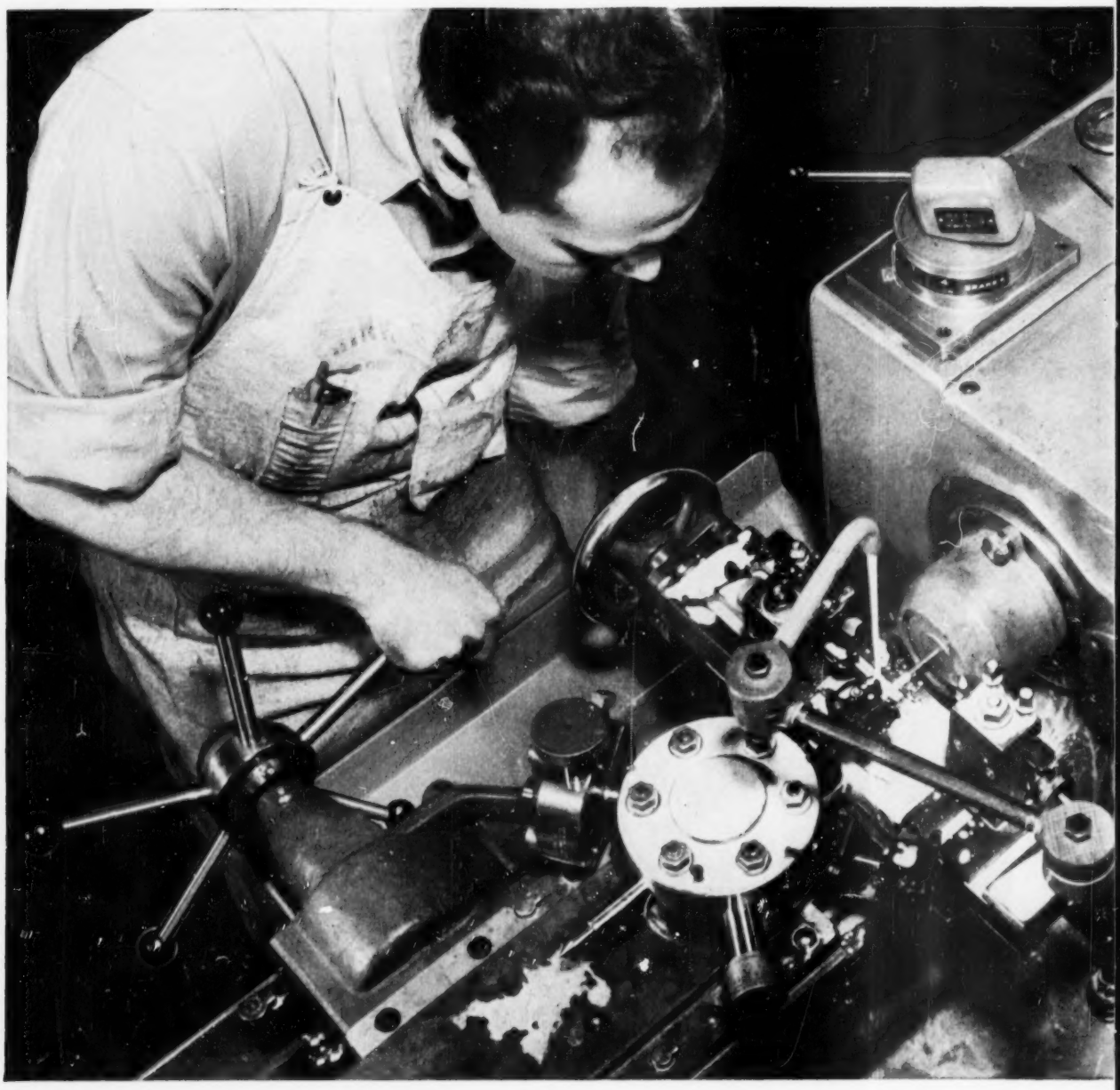


Greater Cutting Efficiency through spindle-mounted flywheel, (optional on CH Models) running with three bearing support. On this job it meant fast metal removal and an excellent finish.



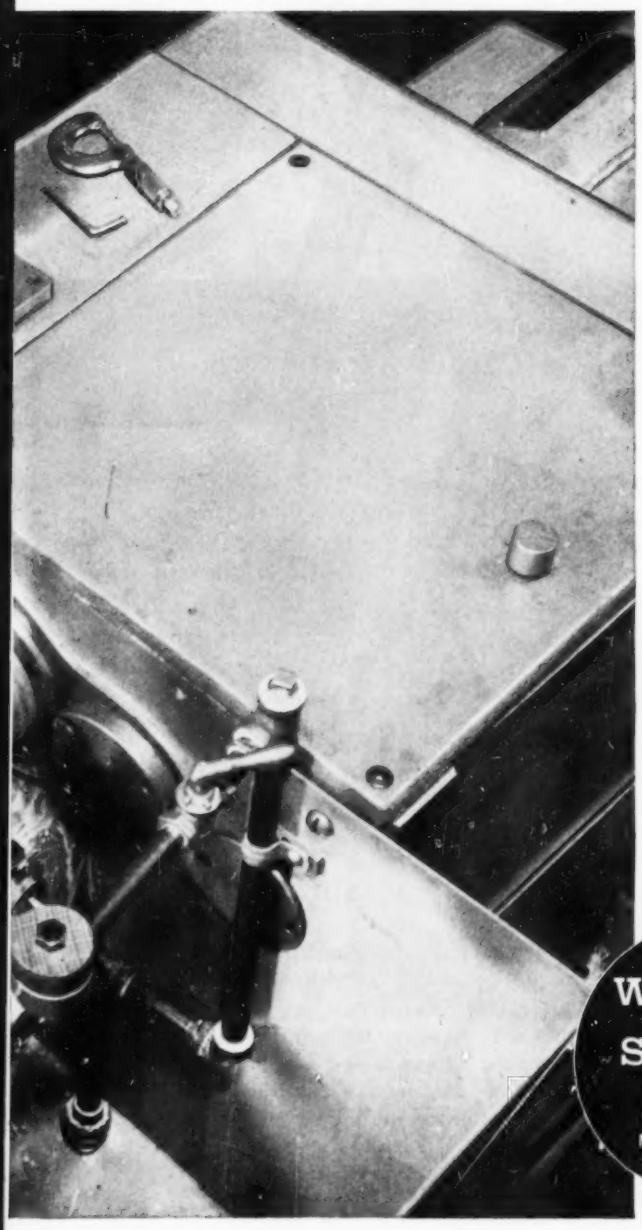
Smoother Feed Performance through large dia. heavy-duty table feed screw that affords greater bearing contact, runs through extra-long table feed nut. All models are equipped with backlash eliminator for more effective climb milling, greater accuracy and longer screw life.

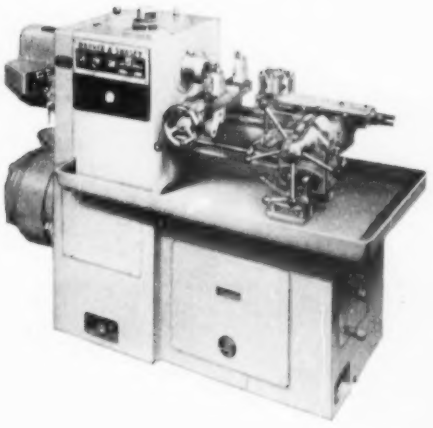
NOW! a small capacity turret and alloy steels more



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY

lathe that turns stainless accurately than ever before!





NOW, FOR THE FIRST TIME, all the versatility of a larger turret lathe has been incorporated in a No. 1 model—the Warner & Swasey No. 1 Electro-Cycle. It is easy to operate and control, designed to meet the high speed requirements of many small diameter bar jobs—to provide plenty of cutting torque at low speeds even for turning and threading hard steels.

Also for the first time, the new No. 1 E-C gives you power feed to turret, a decided advantage in turning high precision jobs involving stainless or alloy steels. This feature, combined with the 1 E-C's wide range of spindle speeds, enables you to make the most efficient use of tools—providing better, more uniform finishes whether you're turning plastics, brass or hard steels.

And like all Warner & Swasey Machine Tools, the No. 1 E-C is ruggedly built to provide the rigidity necessary for lasting accuracy. You'll find it a profit builder on your small bar jobs, in a wide range of lot sizes. So call in your nearest Warner & Swasey Field Representative for all the facts!

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

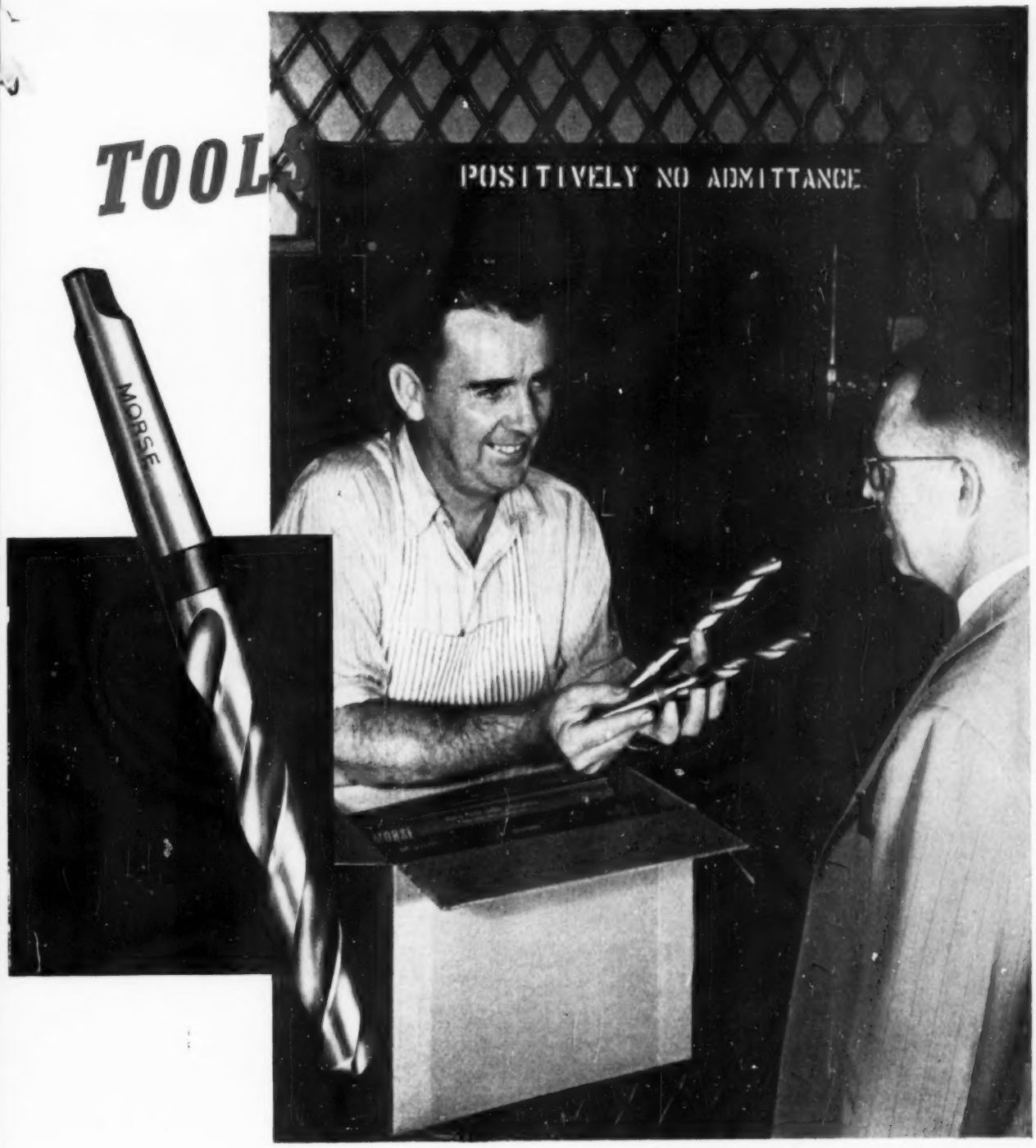
"It all adds up to this: MORSE ELECTROLIZED are the least expensive tools you can buy!"

The tool-crib boss never loses a chance to remind the works manager that: "Every new shipment of Morse Cutting Tools that comes into the plant *pays another bonus in plus-production!*"

That's right. For what Morse Tools *really* cut are *costs* . . . by cutting cleaner and faster . . . by staying on the job longer. And then, of course, to go even further and get the unmatched maximum in tool-life, *specify* Morse Electrolized Tools.

Whatever you need, in standard or special-purpose tools contact your Morse-Franchised Distributor. He'll work out the exact specifications that will give you top performance *on your particular job,* at lowest cost. He has the know-how and the assistance of Morse Engineers to solve any tooling problem.

MORSE TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASS.
(Division of VAN NORMAN CO.)
Warehouses in New York, Chicago, Detroit, Houston, San Francisco



MORSE

Cutting Tools

...buy them by phone from your Morse-Franchised Distributor and save ordering time

Here's another reason it pays to get a proposal from Fosdick

We check flatness to 40 millionths

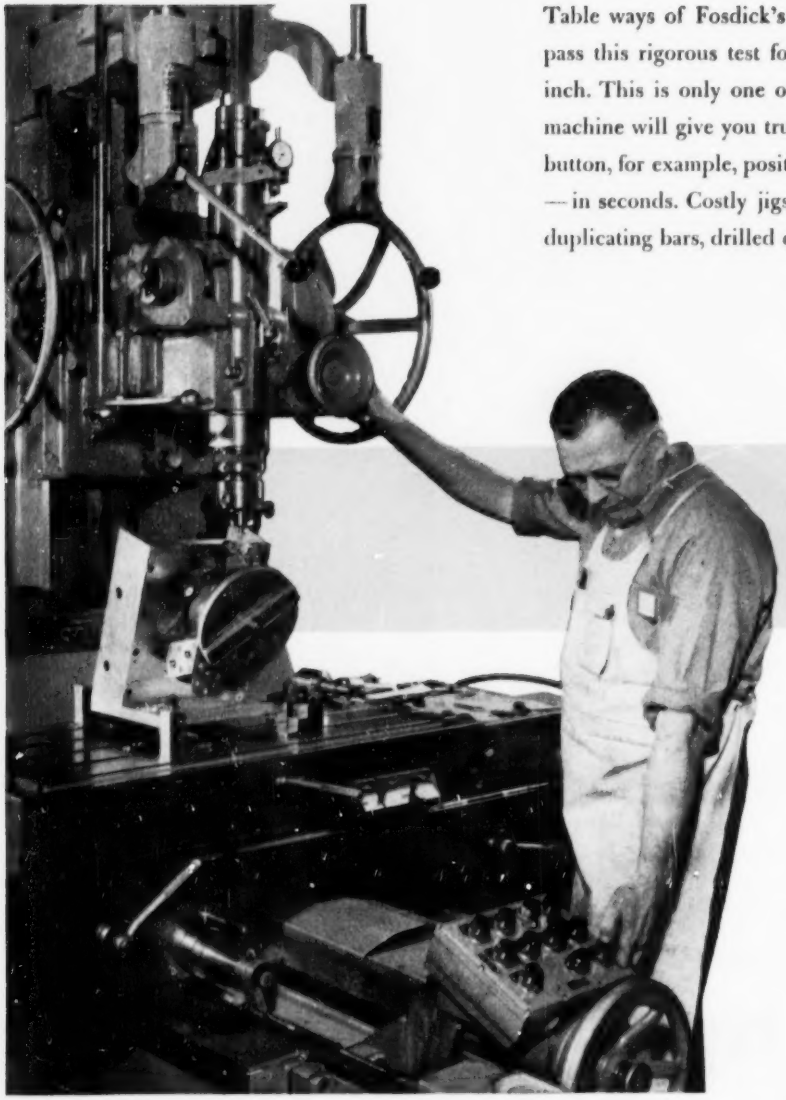


Table ways of Fosdick's Automatic Positioning Machine must pass this rigorous test for flatness—within 40 millionths of an inch. This is only one of many tests we run to make sure this machine will give you true precision production. The touch of a button, for example, positions work for each new hole to ± .0001" —in seconds. Costly jigs have been replaced by two $\frac{5}{8}$" square duplicating bars, drilled quickly for the job, stored easily.

to give you

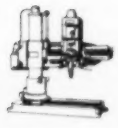
Boring Time "Nose Dives" at Fairchild.

Mass production of precision magnesium housings for commercial and military cabin pressurizers at Fairchild Engine and Airplane Corp. demanded speed and high accuracy. Fosdick's proposal recommended Automatic Positioning Machines. Now Fairchild drills, faces and bores $\frac{31}{32}$" holes with accuracy to ± .0001"—*has slashed boring time 40% over former methods.*

For full description of the Automatic Positioning Machine ask for Bulletin APA.

precision production like this

Need Drilling Equipment? Get a Proposal from Fosdick!


Radial Drills

Jig Borers

Sensitive and Upright Drills

Sensitive Radial Drills

Automatic Positioning Machines

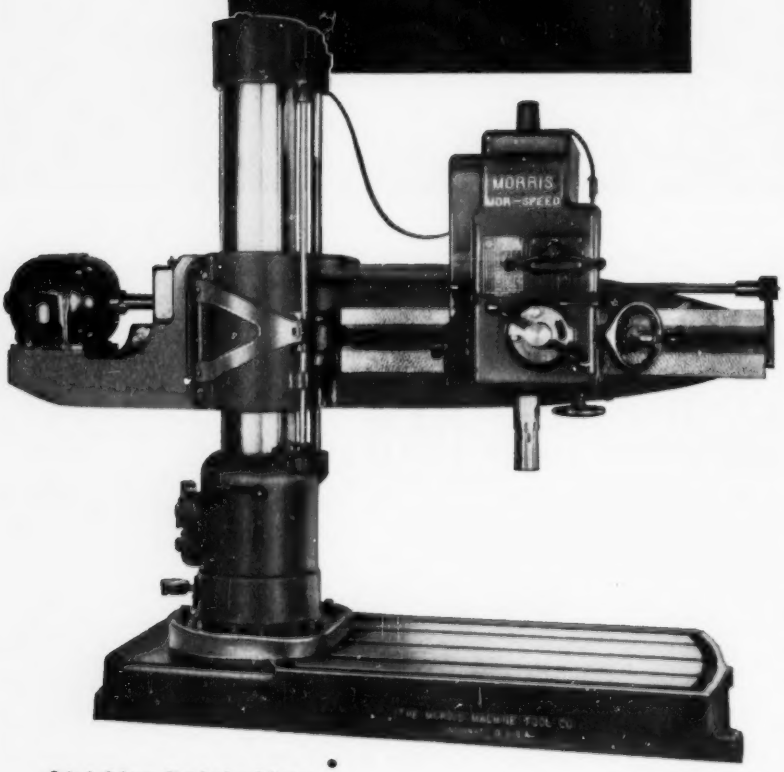
FOSDICK

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

get speed...
safety...
accuracy...
with

MORRIS

MOR-SPEED
RADIAL DRILLS



completely centralized controls . . .

On a MORRIS Mor-Speed Radial Drill every control is in sight . . . within reach . . . easy to operate fumble free!

The operator makes speed, feed and other adjustments, quickly and easily—concentrates on job, rather than on bending, stepping, stooping or reaching for awkward controls. A wide selection of automatic stops and trips cut time per operation to a minimum. Carefully designed, tested safety devices assure complete protection to machine, operator and work. Alloy steels, modern hardening methods and anti-friction bearings . . . at every wear-vulnerable point . . . plus constant lubrication for all operating parts, protect and maintain precision and make Mor-Speed Radials capable of higher production over longer periods of time.

Find out how MORRIS Mor-Speed Radial Drills can make precision work possible and profitable for you, even under your heaviest scheduling demands.

WRITE FOR BULLETIN NO. 59
Early delivery dates available.

THE MORRIS MACHINE TOOL COMPANY
938 HARRIET ST., CINCINNATI 3, OHIO

- 9-inch Column Standard and Heavy Duty models with 3 and 4-foot arms.
- 11-inch Column Heavy Duty models with 3, 4, 5, and 6-foot arms.

a better product at less cost —with precision PLUS production

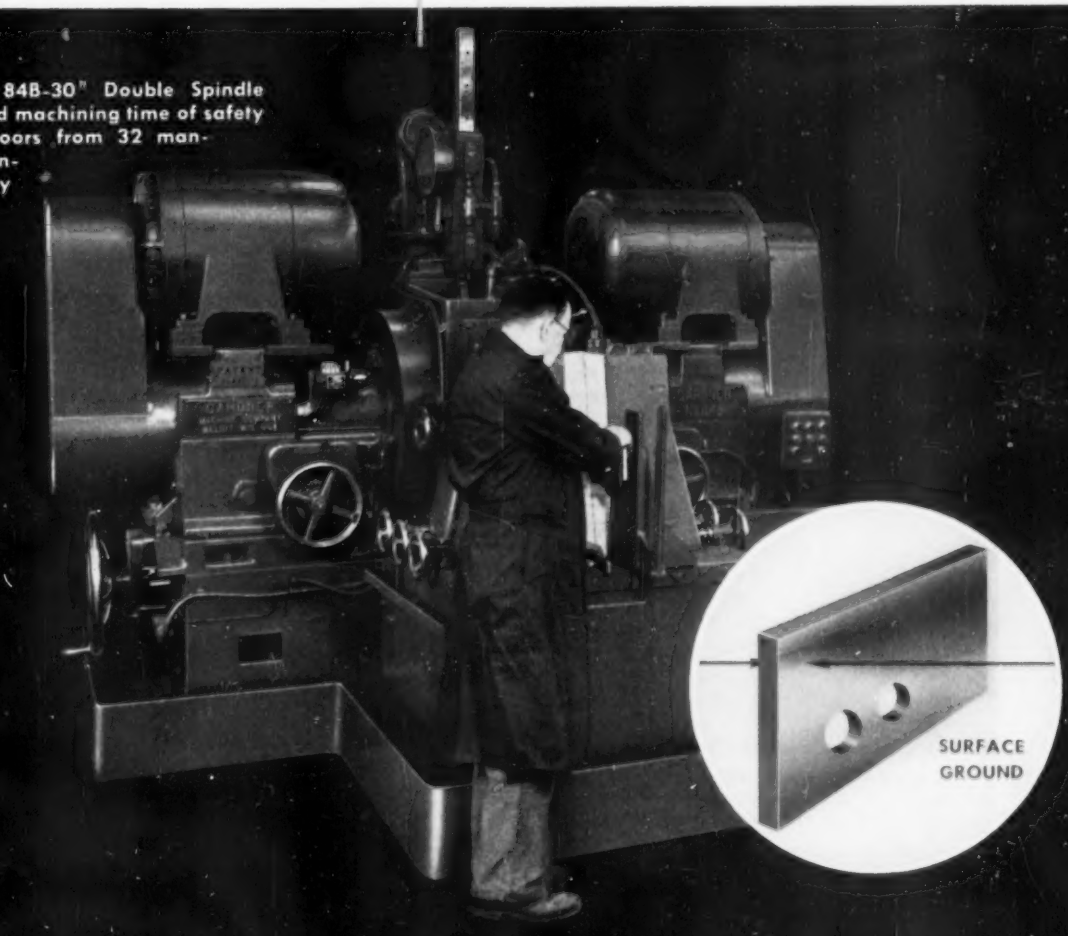
Morris

GARDNER GRINDING
Replaces Combined Milling-Surface Grinding

CUTS COST 75%!

TWO Surfaces Ground in **ONE** Operation

This Gardner 84B-30" Double Spindle Grinder reduced machining time of safety deposit box doors from 32 man-hours to 8 man-hours for daily production requirements.



117M

JOB DATA

MACHINE: Gardner 84B-30" Double Spindle Grinder.

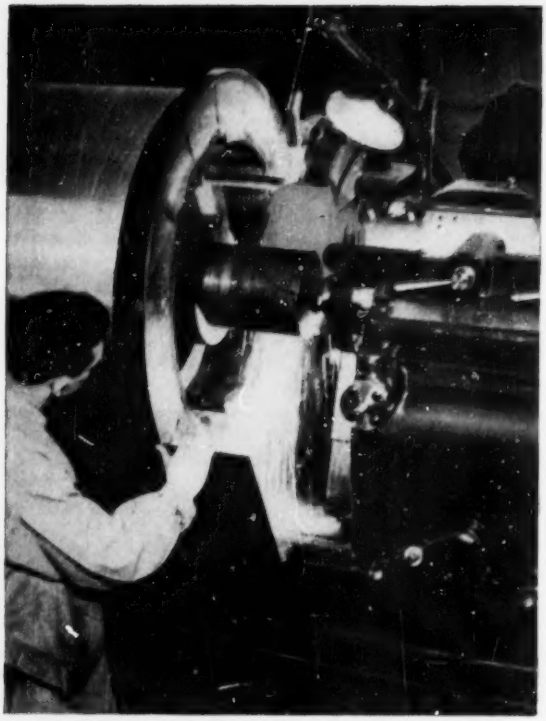
PRODUCTION AVERAGE: 4 to 6 pieces per minute per cut for doors up to 6" x 10"; maximum work size, 12" x 12".

TOLERANCE: .001" to .002" for parallelism. .005" for uniformity.

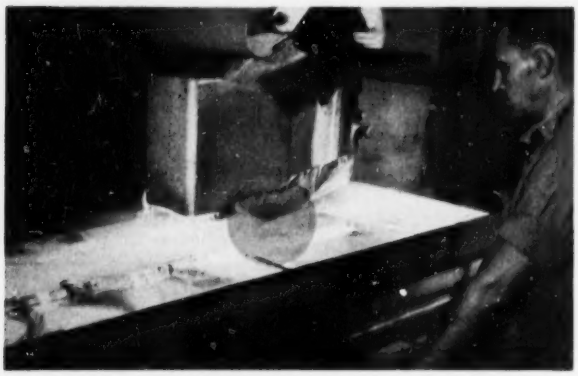
For help with your flat surfacing problems, send us your blueprints for production estimates and tooling suggestions.

GARDNER MACHINE COMPANY
410 Gardner St., Beloit, Wisconsin, U.S.A.

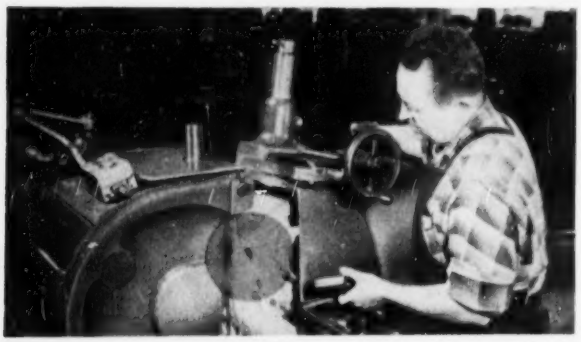
GARDNER
precision disc Grinders



YOU CAN SEE THE DIFFERENCE. The spark stream from a Norton G Bond ALUNDUM wheel is more continuous, more even, indicating uniformity of wheel structure and of cutting action.



YOU CAN HEAR THE DIFFERENCE. Norton G Bond wheels grind with the pleasant, steady swish-h-h of free, easy cutting. You hear no harsh grinding noise.



YOU CAN PROVE THE DIFFERENCE. From general purpose to high production work, every job you do with the new G Bond wheels will benefit by the unique cutting action that grinds faster, freer, and cooler.

NOW!...Boost your profits with the NEW

G BOND

for your latest Norton value-adding

"TOUCH OF GOLD"

It took five years of continuous research and field-testing to bring you the new, exclusive Norton G Bond.

Now the most efficient vitrified bond ever produced is ready to add your latest "Touch of Gold" for increased product-value — and profits — in a wide range of precision and semi-precision grinding jobs.

Secret of the new G Bond's great superiority is the way it holds each abrasive grain for maximum cutting action. Then, *just when it should,* it lets go, assuring a constant grinding surface of new grains with fresh, sharp cutting edges. It is designed to do this better than the bond in any wheel you have ever used before.

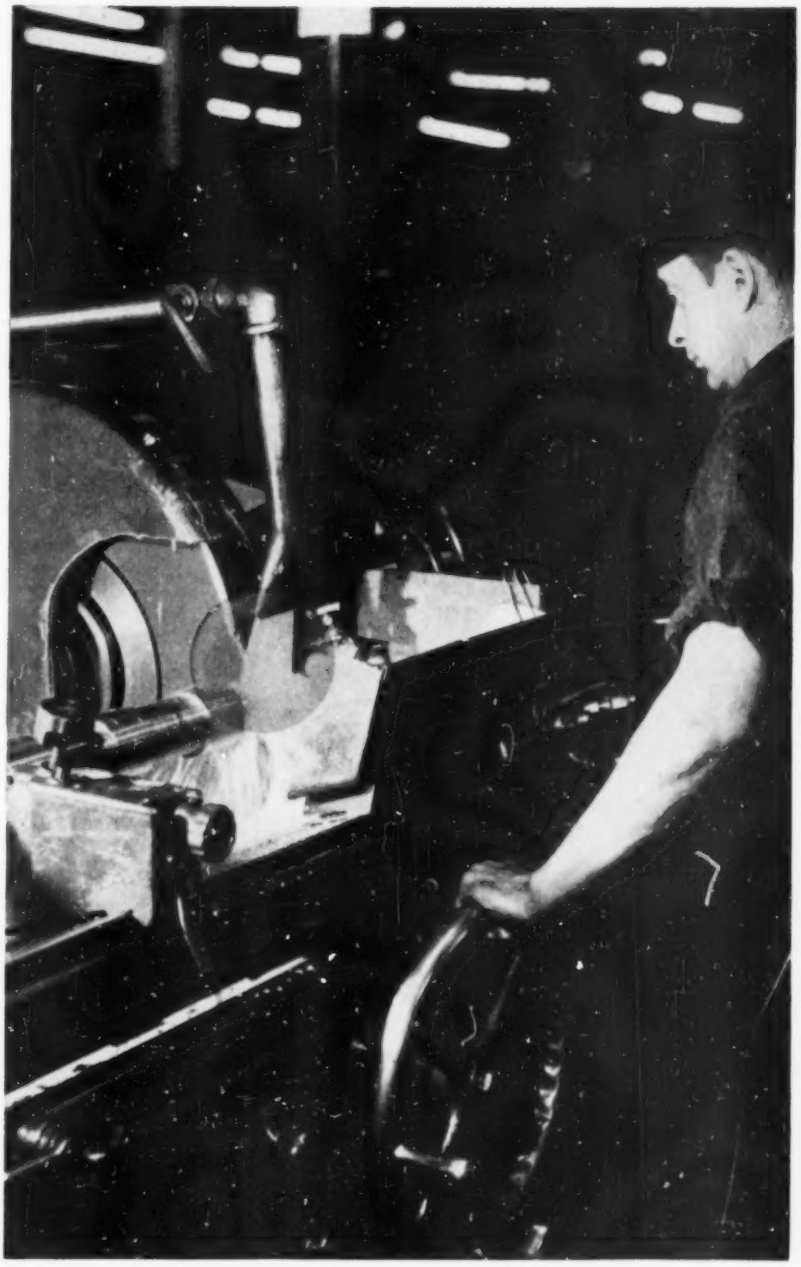
As a result, Norton ALUNDUM* grinding wheels made with the new G Bond have definite advantages that you can *see* and *hear* as they grind — and that are *proved* in the better work they turn out for less cost.

That's your newest "Touch of Gold" developed by Norton to help boost your profits and keep your operators happy. Make sure you add it to your production. And remember, only Norton offers you over 65 years of experience in abrasives, grinding wheels and grinding and lapping machines.

SEE YOUR NORTON DISTRIBUTOR

about arranging a test of the new G Bond ALUNDUM wheels in your plant. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

THE "TOUCH OF GOLD" IS JOB-PROVED. During extensive field-testing, the new Norton G Bond wheels have made a big hit with operators experienced in many types of grinding. Why not get first-hand reports on these radically improved wheels? Try them in your own shop.



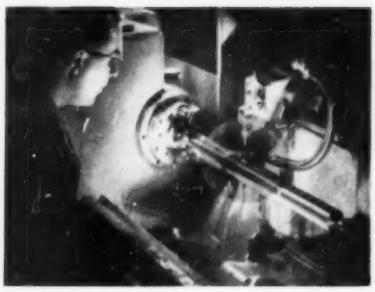
7 BIG ADVANTAGES Norton G Bond ALUNDUM Wheels:

- Do more work per wheel
- Cut freer, cooler, faster
- Dress easier — more pieces per dressing
- Cover a wider range of jobs
- Hold shape — better for form grinding
- Hold corners better
- Ideal for crush dressing

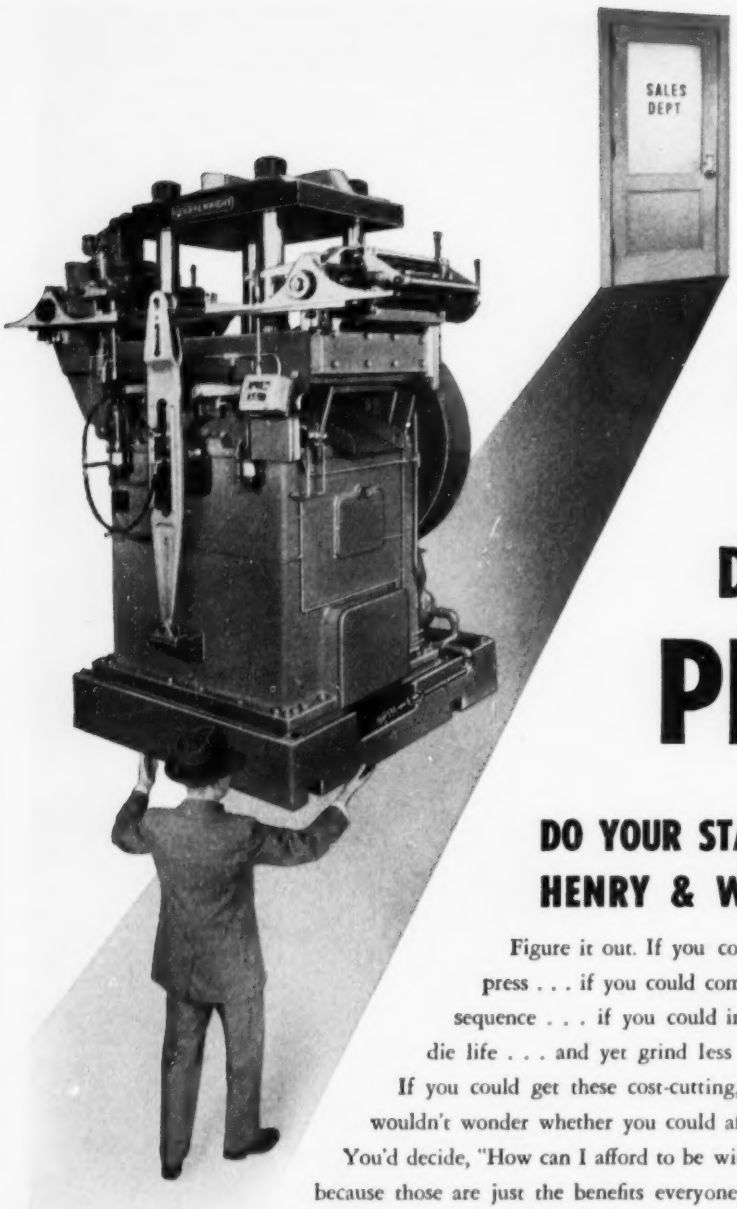
NORTON
ABRASIVES
Making better products to make other products better

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

W-1475



BROAD USEFULNESS. The new Norton G Bond ALUNDUM wheels can boost your profits on many types of grinding, especially cylindrical, centerless, surface, internal, gear, tool and cutter, form and thread grinding, and saw gumming.



RUSH
YOUR SALES DEPARTMENT A
PRICE CUT

DO YOUR STAMPING PROGRESSIVELY ON HENRY & WRIGHT DIEING MACHINES

Figure it out. If you could produce dozens of different jobs on one press . . . if you could combine separate operations into one progressive sequence . . . if you could improve accuracy, get higher speeds with longer die life . . . and yet grind less metal off the die to sharpen it . . .

If you could get these cost-cutting, labor-saving, inspection-reducing benefits, you wouldn't wonder whether you could afford a Henry & Wright Dieing Machine now. You'd decide, "How can I afford to be without it now?" Well, let's talk serious business, because those are just the benefits everyone gets with Henry & Wright Dieing Machines —and, brother, how the Sales Department will love that price cut you'll give them.

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Only the best is good enough

H&W

HENRY & WRIGHT

DIVISION OF EMHART MFG. CO.

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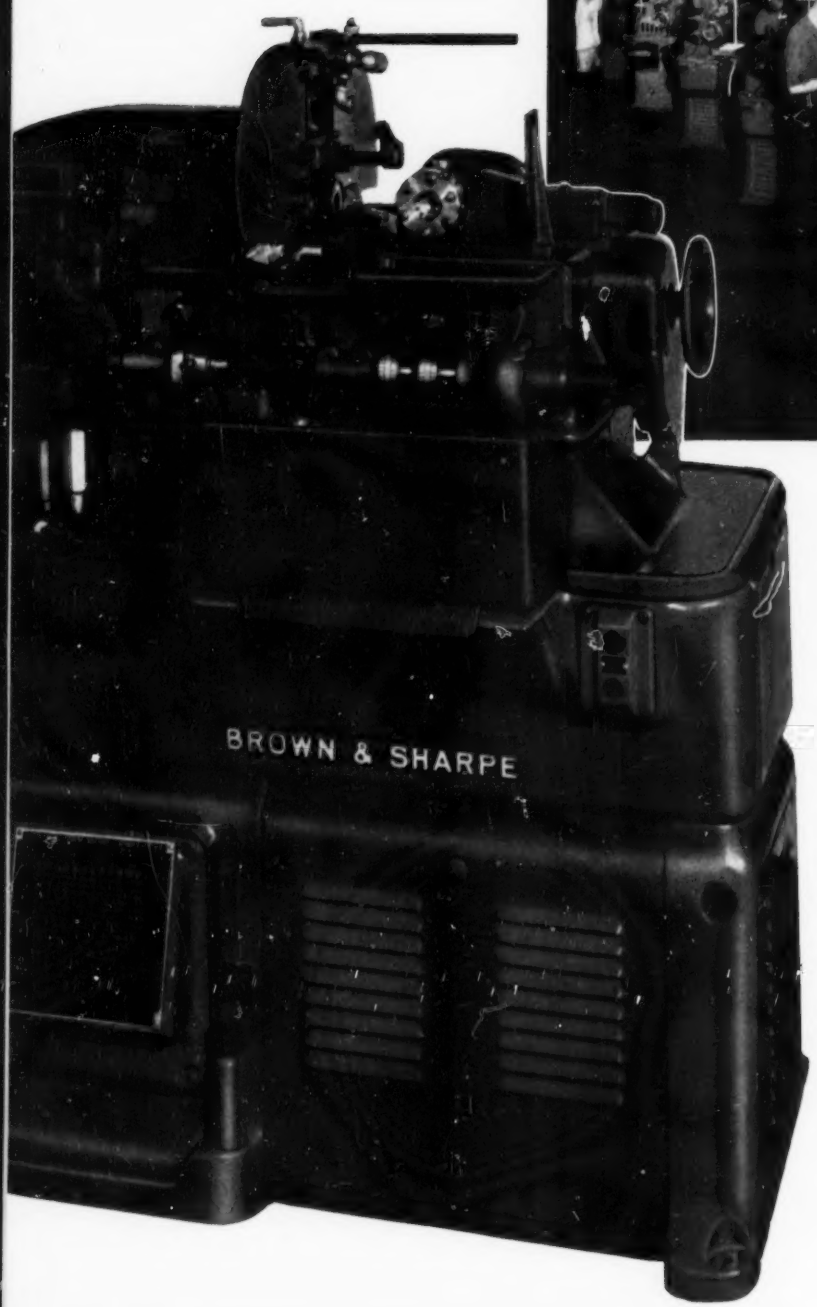
NEW CATALOG Get up-to-the-minute facts on Dieing Machines — capacities range from 25 tons to 2500 tons. Write Henry & Wright, 481 Windsor St., Hartford, Conn.

HIGH SPEED

Screw
Machine
Equipment

Brown & Sharpe

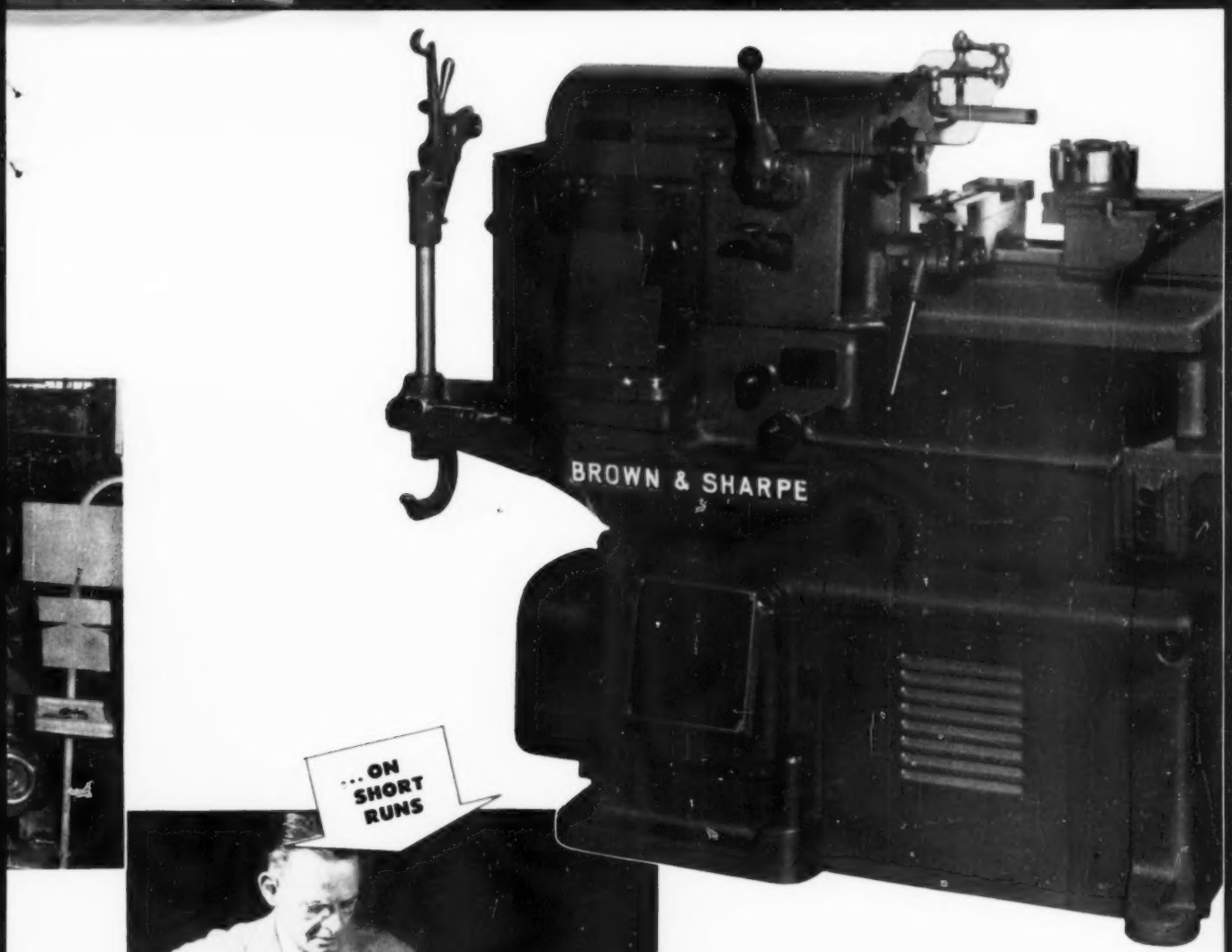
"Speed-up" your Screw Machine Departments...



Brown & Sharpe

Automatic Screw Machines Nos. 00G (illustrated), **0G, 2G, and the new No. 4**

Minimum cost per piece on long and moderate runs is assured with these fast-operating Automatic Screw Machines. Their rapid non-cutting movements, together with wide range of spindle speeds and speed ratios, "speed-up" each operation . . . permit top cutting efficiency on a broad variety of materials. Positive chain drive delivers full power at all speeds. The many attachments available extend the work capacity of these Automatics and often completely eliminate second handling. The three smaller machines are also made in Automatic Cutting-Off types for manufacture of precision parts requiring only forming and cutting-off.

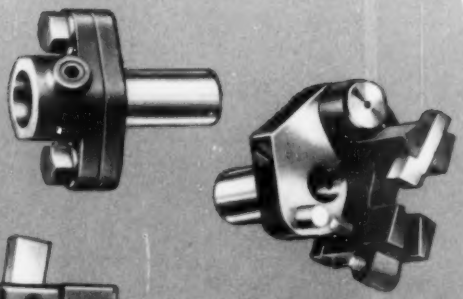


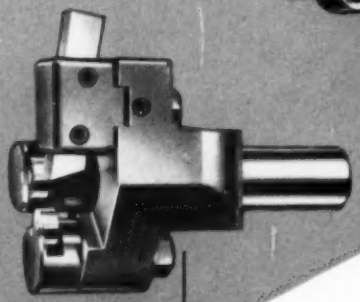
Brown & Sharpe

Hand Screw Machines Nos. 00, 0 (illustrated), and 2

Jobs of small or moderate quantities are more quickly handled on these easy-to-set-up Hand Screw Machines. They perform the same operations as automatics, but do not require cams or timing . . . make short runs and second operation work highly profitable. Due to their ease and simplicity of operation, these Hand Screw Machines are often used to do jobs that would otherwise interrupt long runs on automatics. Tooling is economical inasmuch as they use many of the same tools, collets, and fingers as the automatics. They are a worthwhile addition to any screw machine department.

To Insure Fast, Accurate Screw Machine Production





Brown & Sharpe Screw Machine Tools

Strong, durable, easy to adjust, this complete line of screw machine tools is engineered for uniformly accurate production of fine finish work, at low cost.

New Brown & Sharpe Micrometers

Many new and exclusive features have been designed into these micrometers. Maximum wear resistance is provided by carbide measuring surfaces and one-piece hardened stainless steel spindle and screw with ground threads. Jet black numerals on satin chrome finish make reading easier . . . more accurate.

Write for complete information on any of these Brown & Sharpe Products

BUY THROUGH YOUR LOCAL DISTRIBUTOR

Brown & Sharpe B·S

Milling Machines • Grinding Machines • Screw Machines • Cutters • Machine Tool Accessories
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BROWN & SHARPE MFG. CO., PROVIDENCE 1, R. I., U. S. A.

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. . . whoever uses it in their production is a customer or potential customer of **H-P-M**

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Production men at Caterpillar Tractor Company find versatile H-P-M All-Hydraulic presses perform a wide variety of jobs in building Caterpillar's extensive line of tractors, engines, motor graders and rugged earth-moving equipment. There are 6 H-P-Ms in this diversified production line, ranging in size from 500 to 3500 tons . . . and, one press may do work on as many as 15 or 20 different parts.

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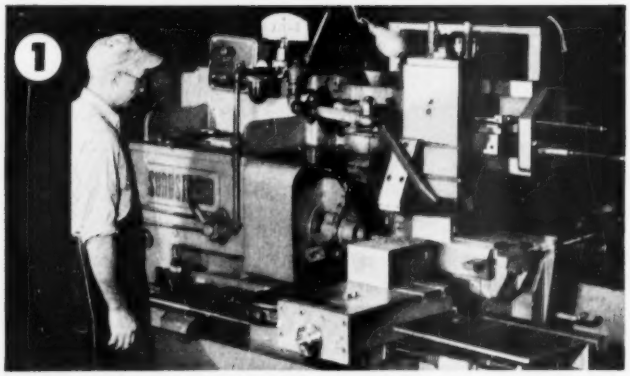
How To Turn Out More Work On Jobs Like These . . .

Small Lot Turning

This Model 12A Automatic Lathe is one of a Sundstrand turning battery in production on components of heavy road building machinery. Over two to one production increases are obtained on the various cast iron and steel parts. Lot sizes range from 150 to 200 pieces. Ease of set-up for different operations provides high production advantages on small lot turning.

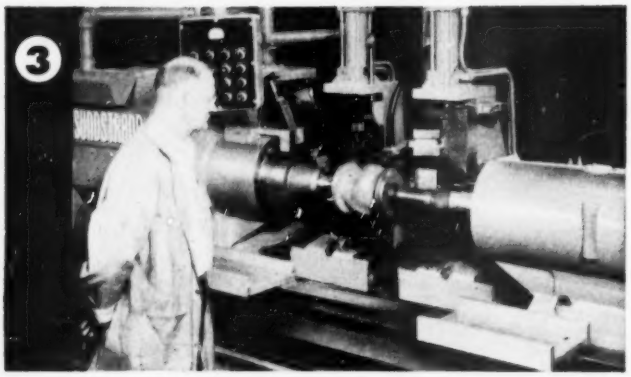


Long Run Turning

Here's a Model 8A Sundstrand Automatic Lathe tooled to produce 250 bevel gear blanks per hour. Two parts are mounted on an arbor so that two gear blanks are completed with each cycle of the machine. Like all Sundstrand Automatic Lathes, this one has all of the modern design features described on the opposite page.

Special Turning

Both ends of valve bodies are machined simultaneously on this special Model 16 Lathe. Automatic cycle includes facing flanges, indexing of tools for "phonograph finishing" in a 2nd cut and return. Each carriage mounts a slide on which two tool blocks are vertically indexed in two positions. The work is held between centers on an arbor, and tools are positioned to the work by air operated sight target. All adjustments and starting of cycles are made from push button station.



SUNDSTRAND

RIGIDMILS • AUTOMATIC LATHES • HYDRAULIC EQUIPMENT

Design Features of SUNDSTRAND Automatic Lathes That Make This Production Possible

• Greater Horsepower

All new Sundstrand Automatic Lathes have been redesigned for greater rigidity and larger spindle drive motors. They have ample power for use of carbide cutting tools and are capable of doing more work.

• Wider Speed Range

Spindle speed range ratios have been increased to 30 to 1 to obtain maximum in cutting efficiency over a wider range of sizes of parts and material. The spindle unit is equipped with two driving gear centers, which increase the range between high and low spindle speeds. In addition, four speed changes can be obtained from one set of gears instead of the usual two.

• Wider Feed Range

A wider feed range has been provided to enable the handling of a greater range of parts and materials at maximum cutting efficiency. The New Models 4A, 8A, and 12A have a ratio of 18 to 1 between high and low feeds — Model 16 has an even greater range.

• Greater Carriage Adjustment

Both front and rear carriage of the latest Sundstrand Automatic Lathes are adjustable full length between headstock and tailstock centers — another important new feature.

• Faster Set-Up

Convenient location of pick-off gears for changing spindle speeds and front and rear carriage feeds is provided. Feed and speed chart and pick-off gear storage compartment are readily accessible for quick set-up or changeover.

• Quick Cycle Changeover

Complete control of all cycles is provided by adjustment of dogs on a disk. Making cams is eliminated. Changing position of dogs on disk changes length of rapid approach, feed and rapid return strokes — enables operator to set up cycle quickly and change over from one job to another easily.

• Automatic De-Clutching

All new models have been provided with automatic declutching between spindle and spindle motor with self-adjusting magnetic clutch and brake for quick stopping of spindle rotation.

• Screw Feed to Front Carriage

All new Sundstrand Automatic Lathes have screw instead of rack feed to the front carriage — resulting in fine finish and long tool life.

4 Models Cover HP Range of 3 to 75 HP

	MODEL 4A	MODEL 8A	MODEL 12A	MODEL 16
SPINDLE MOTOR	3 to 10 HP	10 to 25 HP	20 to 50 HP	50 to 75 HP
SPEED RANGE (Type A) (Type B)	60 to 1800 RPM 120 to 3600 RPM	40 to 1200 RPM 30 to 2400 RPM	30 to 900 RPM 60 to 1800 RPM	15 to 750 RPM
FEED RANGE	.003 to .048 IPR.	.004 to .070 IPR	.004 to .070 IPR	.0025 to .100 IPR
FRONT CARRIAGE: Longitudinal feed with angular feed-in, max. Swing over cross slide, max. Rapid traverse rate	 5" 8¾" 275"	 6" 12½" 250"	 8" 15¼" 250"	 12" 17" 250"
REAR SLIDE: Max. Stroke	4"	5½"	6½"	8"
LENGTH BETWEEN CENTERS	15, 24 & 36"	24, 36, 48 & 60".	24, 36, 48 & 60"	36, 60 & 84"

FREE ADDITIONAL DATA

The complete new line of Sundstrand Automatic Lathes includes the Models 4A, 8A, 12A and 16 ranging from 3 to 75 HP. Write for complete information on these new machines today. Ask for bulletin 131.

SUNDSTRAND

SUNDSTRAND
Machine Tool Company
2533 Eleventh St. Rockford, Ill., U.S.A.

DRILLING AND CENTERING MACHINES • SPECIAL MILLING AND TURNING MACHINES

In parts for rotary drills

pre-hardened, free-cutting Carilloy FC steel

▲ A drill and a drill box, one at either end of these 20-ft. rotary drill rods, are used to connect the rods. In the close-up, the box-ends of two rods are shown at the left and the pin end of another rod at the right. Now made from U·S·S Carilloy FC Steel, these coupling devices cost 12% less and are easier to machine.

▲ Gill Rock Drill Co. now machines drill boxes and pins without sending the steel out for heat treatment before and after rough machining. Elimination of this extra heat treatment prevents production delays and cuts costs.

...eliminates 2 heat treatments

...machines easily

...cuts costs 12%

At Gill Rock Drill Co., Lebanon, Pa., pins and boxes for heavy duty rotary drills are turned, drilled, and threaded from U·S·S Carilloy FC steel *without* any additional heat treatment. This steel comes from the mill ready to use—hardened to 321 Brinell and with good machinability.

The alloy steel formerly used for these drill pins and boxes had the needed strength and toughness; but it had to be sent out for heat treatment before and after machining. This took time . . . and cost money.

Now made from Carilloy FC steel, these parts are machined *completely* without further heat treatment, are easier to machine, meet all the high quality specifications, and cost 12% less than before. Carilloy FC is performing so well in pins and boxes that it is now being used for rotary drill collars as well.

It will pay you to investigate the possibility of using Carilloy FC steel for your products. It comes in all standard bar forms and sizes, quenched and tempered, to a hardness from 255 to 375 Brinell. Tensile strengths range from 125,000 to 175,000 psi. Our experienced metallurgists will be glad to give you complete details. Just write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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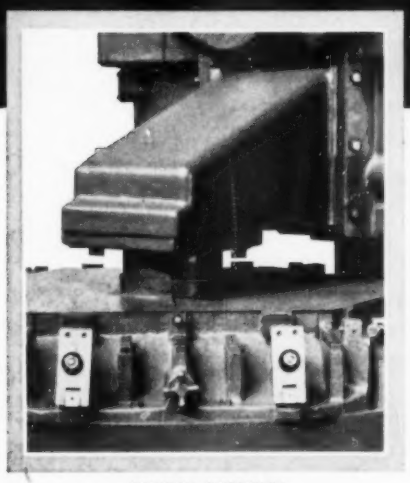
USS Carilloy Steels

3-1041 ELECTRIC FURNACE OR OPEN HEARTH COMPLETE PRODUCTION FACILITIES IN CHICAGO OR PITTSBURGH

UNITED STATES STEEL

NEWTON VERTICAL SPINDLE ROTARY CONTINUOUS MILLING MACHINES



CENTER SUPPORT
Furnished when required

DESIGNED FOR HEAVY MILLING WITH CARBIDE CUTTERS

This representative example of Newton high production milling machines has the advanced features required for heavy precision milling with carbide cutters and motors up to 50 H.P. An unusually rugged frame provides the rigidity necessary to such operation. On long work pieces such as automobile and tractor cylinder heads, 36" between spindles makes possible the completion of the roughing cut before the finishing cut starts. Independent pick-off gears for each spindle provide the means for correct cutting speeds for both roughing and finishing cuts. Heavy flywheels, solidly attached to each spindle, insure maximum cutter life between grinds. Intermittent feed—rapid traverse attachment and center support are optional. Two standard table sizes. Other table sizes and spindle center distances are available. Newton Milling Machines, applicable to your precision milling problems, will help to step up your production and reduce your costs. Complete information will be furnished upon request.

Among Heavy Machine Tools built by Consolidated are . . . .

LATHES
BORING MILLS
DRILL PRESSES
MILLING MACHINES
BORING MACHINES
COLD SAW MACHINES
BORING, DRILLING AND MILLING MACHINES
DRILL AND TOOL GRINDERS
PLANERS
SLOTTERS
RAILROAD SHOP TOOLS
AUTOMOTIVE TOOLS
AND OTHER SPECIAL MACHINES

BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1848

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SUBSIDIARY OF FARREL-BIRMINGHAM COMPANY, INCORPORATED

ROCHESTER, NEW YORK

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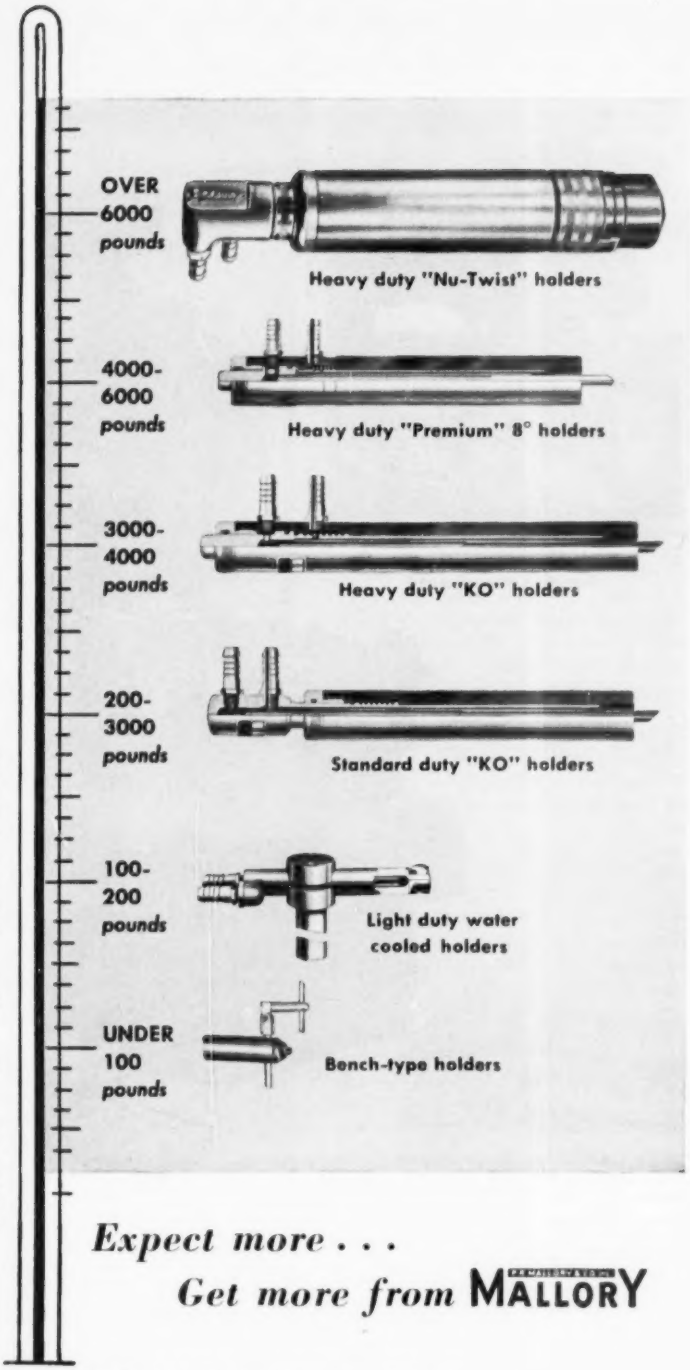
Mallory has the holders and electrodes in stock

Resistance welding pressures from under 100 pounds to over 6,000 pounds can be handled by standard Mallory holders and electrodes . . . available from stock. The new Mallory "Nu-Twist"* holders and electrodes will perform in the high pressure ranges needed for welds to meet all present military specifications . . . as well as the most demanding commercial requirements.

Because holders and electrodes are available in a wide variety of shapes and sizes, standard units can be combined to handle practically any resistance welding job without the cost or delay of special designs.

Like to see our complete line? Then write to us, or have your Mallory distributor drop by with a copy of Catalog 550C. See for yourself the complete range of holders, electrodes and accessories that are on the shelf for immediate delivery.



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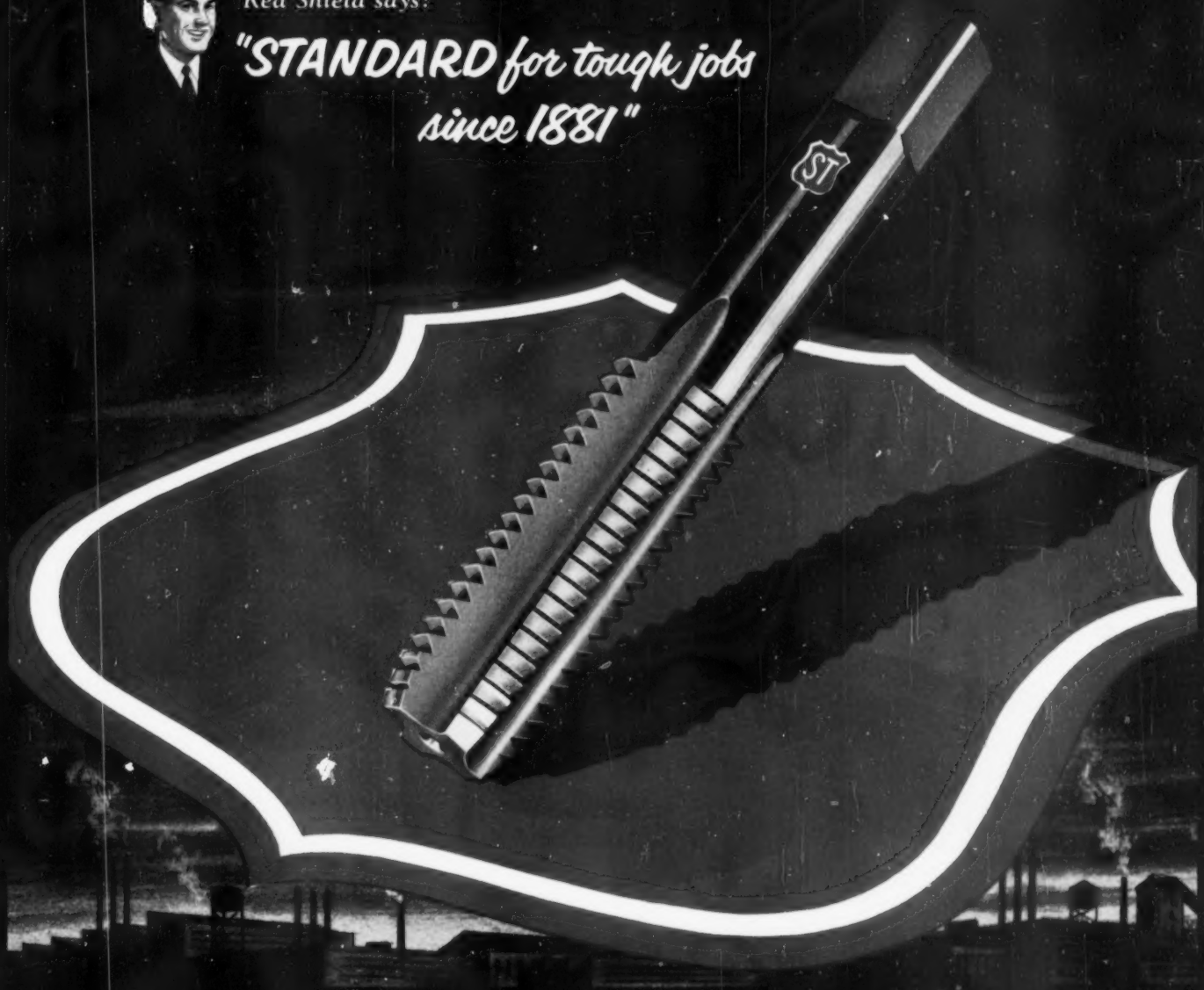
Red Shield says:

"STANDARD for tough jobs since 1881"



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THE STANDARD LINE: *Twist Drills · Reamers · Taps · Dies · Milling Cutters · End Mills · Hobs · Counterbores · Special Tools*

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Equip with
ARMSTRONG TOOL HOLDERS
for Defense production

A change over to new products, starts in the tool room and the die shop . . . starts with ARMSTRONG TOOL HOLDERS. In preparing for defense orders, the logical first step is to check your stock of ARMSTRONG TOOL HOLDERS. With the correct types for every operation, and the correct sizes for each lathe, planer, slotter and shaper, you will be able to start work on a moments notice.

ARMSTRONG TOOL HOLDERS reduce "tooling-up" to the selection of a cutter and tightening of a set screw. They permit operation at higher speeds, and heavier feeds than are customary—they enable you to produce more pieces per hour, per man, per machine.

Produced by modern methods, in a specially-built tool plant, they are the lowest cost tooling you can buy. And, they are as available as your telephone for they are carried in stock by your local supply house.

Use ARMSTRONG TOOL HOLDERS wherever possible for lower tool cost, saving in High Speed Steel, increased output and greater profit. *Write for Catalog*

ARMSTRONG BROS. TOOL CO. *"The Tool Holder People"* 5215 W. ARMSTRONG AVENUE CHICAGO 30, ILL.

MORE AIRCRAFT...

thanks to Monarch

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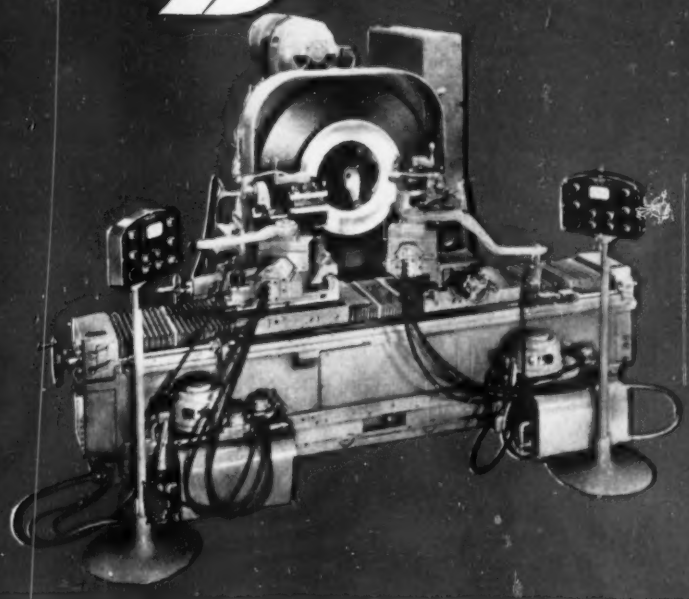


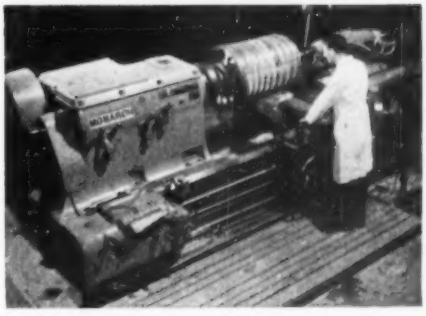
The Monarch 60" Right Angle Lathe. Model O, principally for turning and boring, features two slides, either or both of which can be Air-Gage Tracer controlled. Model F, with single slide and constant surface cutting speed, is principally for facing.

Monarch Lathes with Air-Gage Tracer Controls Speed Jet Engine Production

High output, and extremely accurate output, are two advantages that these dissimilar Monarch turning machines both possess in common. Each is controlled by the Monarch Air-Gage Tracer—and no other duplicating method yet devised surpasses it in speed of accurate output.

The Monarch 60" Right Angle Lathe, used principally for jet engine production today, is ideal for any thin-walled work piece with large diameter. The 32" Model NN Heavy Duty Lathe is shown contouring a rotor assembly—one of the most exacting operations in jet aircraft production. Yet it has all the size, power and rigidity, when needed, to hog heavy cuts from big work.

Whatever your turning, facing or boring job may be, you'll find in the complete Monarch line the lathe to produce it better, faster, more economically. *Three* different duplicating devices are applicable. And the whole story—with pictures, specifications and job reports—is instantly available to you in our complete brochures. Write for yours today! . . . *The Monarch Machine Tool Co., Sidney, Ohio.*



Monarch 32" Model NN Heavy Duty Lathe with swivelling Air-Gage Tracer. Machine may be used for a wide variety of turning, boring or facing operations—under tracer or conventional manual control.

Monarch
ACCURACY • ECONOMY • LONG LIFE
TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

John Coulter says, "This Model 142 SKIL Grinder with its easy handling makes grinding of these castings a lot easier. It's well balanced for either right or left hand use. I prefer these SKIL Grinders over the others we have used."

SKIL

PORTABLE TOOLS

says **Mr. Lou Grundon,** president
Little Giant
Crane & Shovel, Inc.
Des Moines, Iowa

"3 year comparison tests prove SKIL best"

Mr. Grundon knows tools and how to get the most out of them. He has orders for his Little Giant Cranes and Shovels from as far away as Serbia, Venezuela and Arabia.

"We've used 6 SKIL Grinders for 3 years in direct competition with other brands," Mr. Grundon says, "and as a result, we plan to stick to SKIL tools in the future.

"The performance of the SKIL tools has been excellent. And SKIL service has kept our production going at top speed. After trying several brands, we found SKIL the only make that gives us both performance and service."

SKIL Products Are Made Only By SKIL Corporation
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Please send information showing how SKIL tools can save us money by increasing production or reducing handling costs.

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STERLING'S Unusual Guarantees Better

This cut-away view shows one of several Allen-type screws, regularly spaced in the Easymount, engaging the retaining band and rigidly holding the wheel in place. Releasing the screws removes pressure on the band, permitting quick and easy wheel removal.

EASYMOUNT Construction CARBIDE TOOL GRINDING

Easymount assembly rigidly retains the wheel while in use, yet permits easy removal anytime. Handles many jobs ordinarily reserved for diamond wheels! Saves time and money!

Sterling's Easymount assures longer than usual wheel life and better grinding. Close, accurate results are possible always because there can be no slippage of the wheel in the Easymount. Important too, is the fact that you need return no backplates--once attached to your machine, the Easymount lasts as long as the grinder, actually cutting the cost of your grinding assembly and resulting in a saving in future Sterling wheel purchases from 18% to 56%!

Sterling's special Easymount Wheel bonds have created new possibilities for obtaining better grinding and longer life from these superior abrasive units. You can now grind both carbide tips and shanks with the same wheel! There is also available a new Sterling bond which has created an Easymount Wheel that has, in many instances, replaced diamond wheels--at much lower cost!

Sterling Easymounts and Wheels have years of experience behind them and are in use all over the country. Try them! Realize the new economy and efficiency that is possible once you have this superior grinding assembly on your machine. Sterling engineers will gladly run a test in your plant.

BEST IN THE TEST—THAT'S STERLING

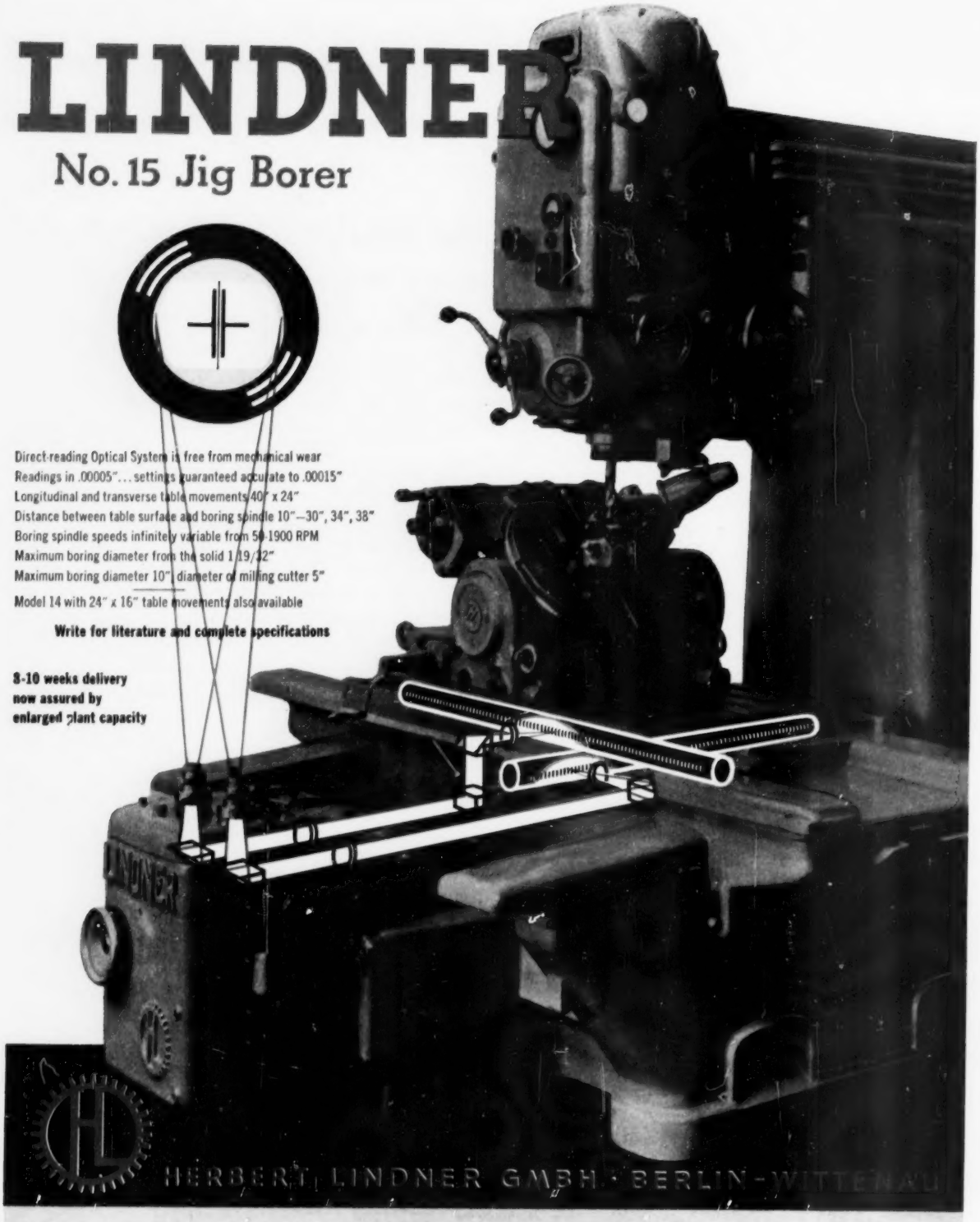
In a recent test with competing wheels, Sterling's Easymount, fitted with a GC60 J14 VAD Sterling Wheel, was reported by the customer to be the best wheel for wet grinding on carbide. It cut freer and lasted longer--the usual results you can expect on all your jobs on which Sterling's Easymount and Wheels are used in your plant.

Send for Your Free Folder on Sterling's Easymounts and Wheels!

There's important news in this attractive folder on Sterling's Easymounts and Wheels. You'll be interested in the types of Easymount wheels that are not only doing a great job on carbides, but are also very satisfactory for the fast sharpening of tools of various steels. All sizes of Easymounts and Wheels are described in this folder and a listing given of the machines they fit. Complete price data is also included. Write for your copy of this folder today . . . it will be sent at once at no obligation whatever.

LINDNER

No. 15 Jig Borer



Direct-reading Optical System is free from mechanical wear
Readings in .00005"... settings guaranteed accurate to .00015"
Longitudinal and transverse table movements 40" x 24"
Distance between table surface and boring spindle 10"—30", 34", 38"
Boring spindle speeds infinitely variable from 50-1900 RPM
Maximum boring diameter from the solid 1 19/32"
Maximum boring diameter 10"; diameter of milling cutter 5"

Model 14 with 24" x 16" table movements also available

Write for literature and complete specifications

8-10 weeks delivery now assured by enlarged plant capacity

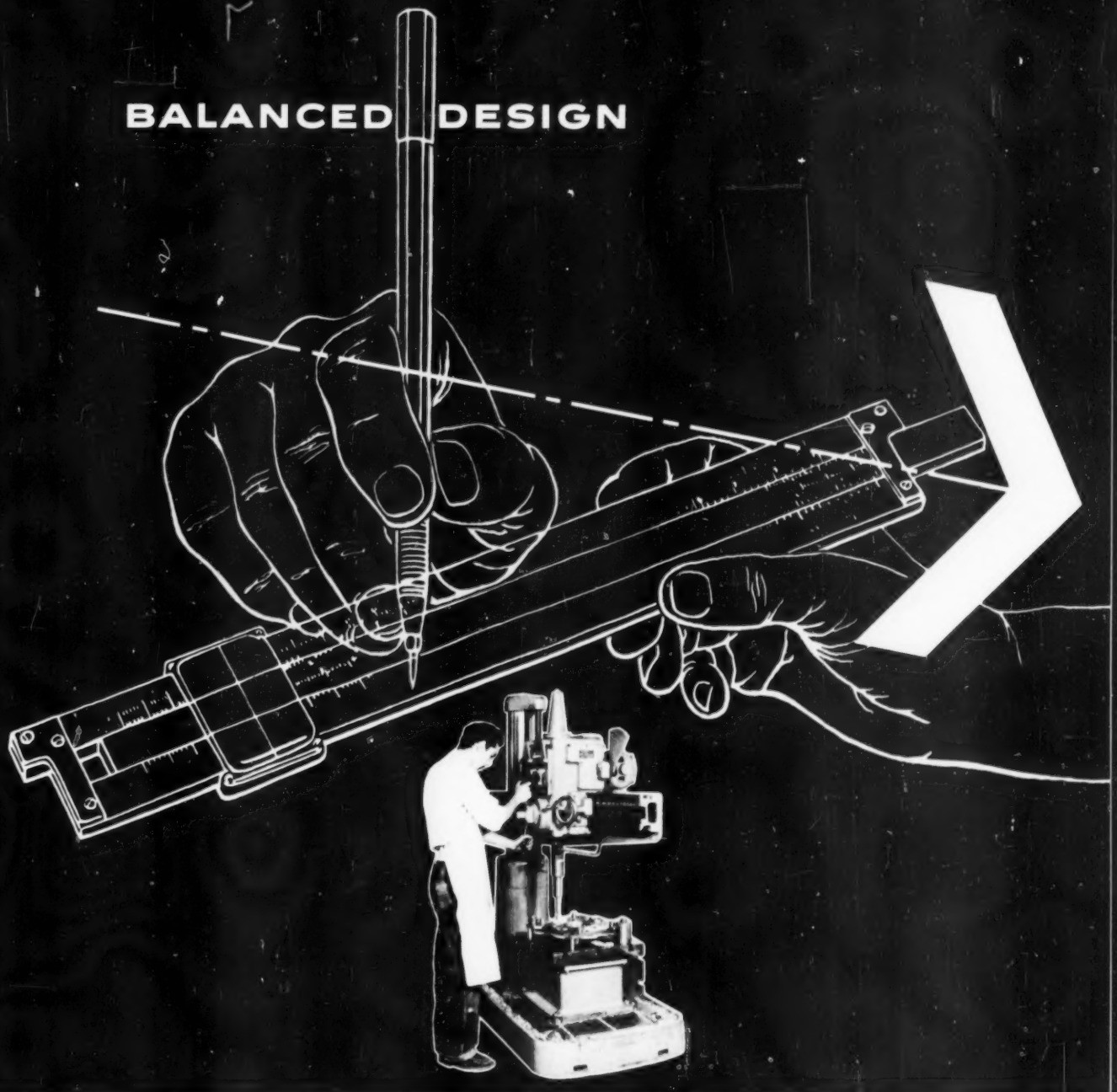
KO CO., INC. INDUSTRIAL IMPORTERS

KURT ORBAN

COMPANY, INC.

205 East 42nd St., New York 17 • 4220 Prospect Avenue, Cleveland 3

BALANCED DESIGN



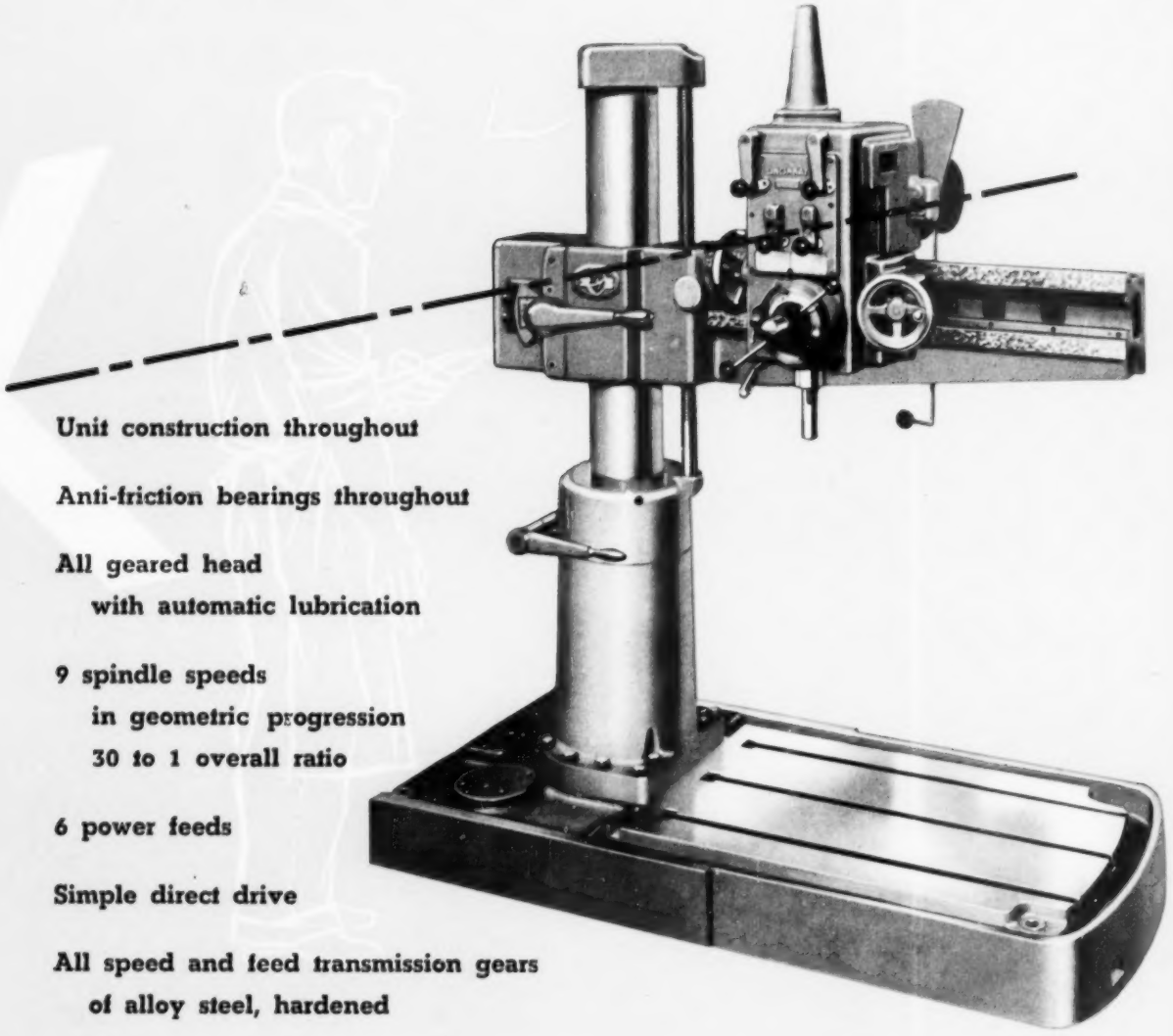
We're getting reports from all over the country on how operators really like the new 3' Arm 7" Column Radial Cintidrill. The smooth way it "handles" . . . the wide range of jobs within its 1-inch capacity . . . its round-the-clock reliability – can all be summed up as BALANCED DESIGN. It'll be worth a check right soon on how this new economy-priced radial can smooth out drilling schedules and save money for you.

best buys in their class!

CINTIDRILL

CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO, U. S. A.

MORE **QUALITY** FEATURES



Unit construction throughout

Anti-friction bearings throughout

All geared head
with automatic lubrication

9 spindle speeds
in geometric progression
30 to 1 overall ratio

6 power feeds

Simple direct drive

All speed and feed transmission gears
of alloy steel, hardened

This cost-saving radial is just one of the complete balanced line of Cintidrills, including 21″ sliding head box and round column floor drills; 14″ 3000 and 16″ 3000 sliding head bench and floor drills; 16″ and 18″ Royal Cintidrills, bench and floor models, single and multiple spindles. Write for catalogs and name of your nearest dealer.

best buys in their class!

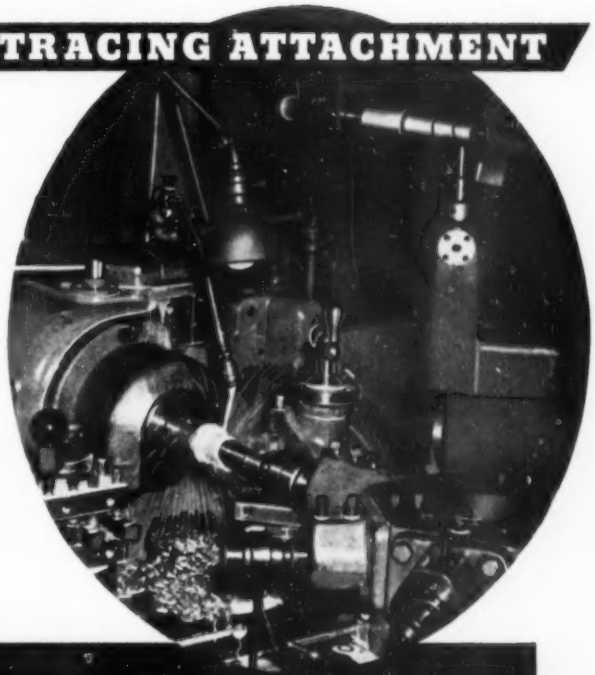
CINTIDRILL

CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO, U. S. A.

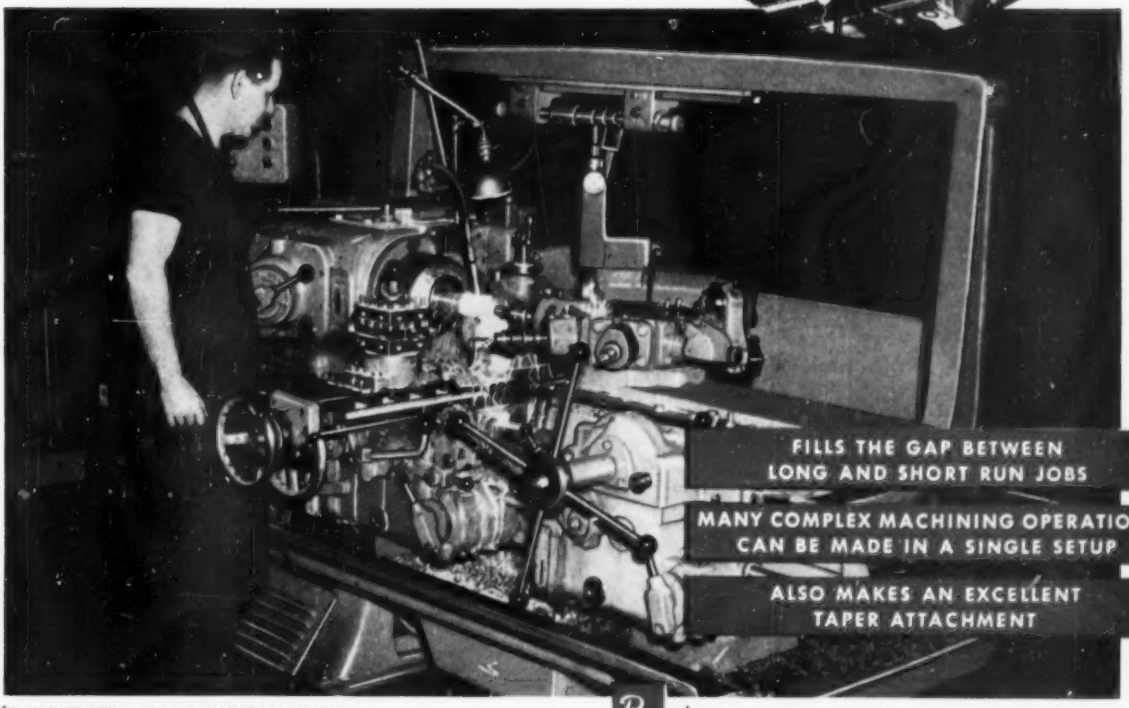
PRINTED IN U. S. A.

NEW HYDRAULIC TRACING ATTACHMENT

for J&L turret lathes*



Will reduce your costs — direct and indirect — by combining in a single machine all the advantages of TRACING for contour turning, boring or facing operations, with the advantages of multiple tooling and the many other time saving, cost saving features of J & L Universal Turret Lathes.



FILLS THE GAP BETWEEN LONG AND SHORT RUN JOBS

MANY COMPLEX MACHINING OPERATIONS CAN BE MADE IN A SINGLE SETUP

ALSO MAKES AN EXCELLENT TAPER ATTACHMENT

*RAM TYPE or No. 7 SADDLE TYPE

P.S. → This attachment can be purchased with new machines or installed in the field on machines now in service. Write for descriptive leaflet giving complete specifications.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

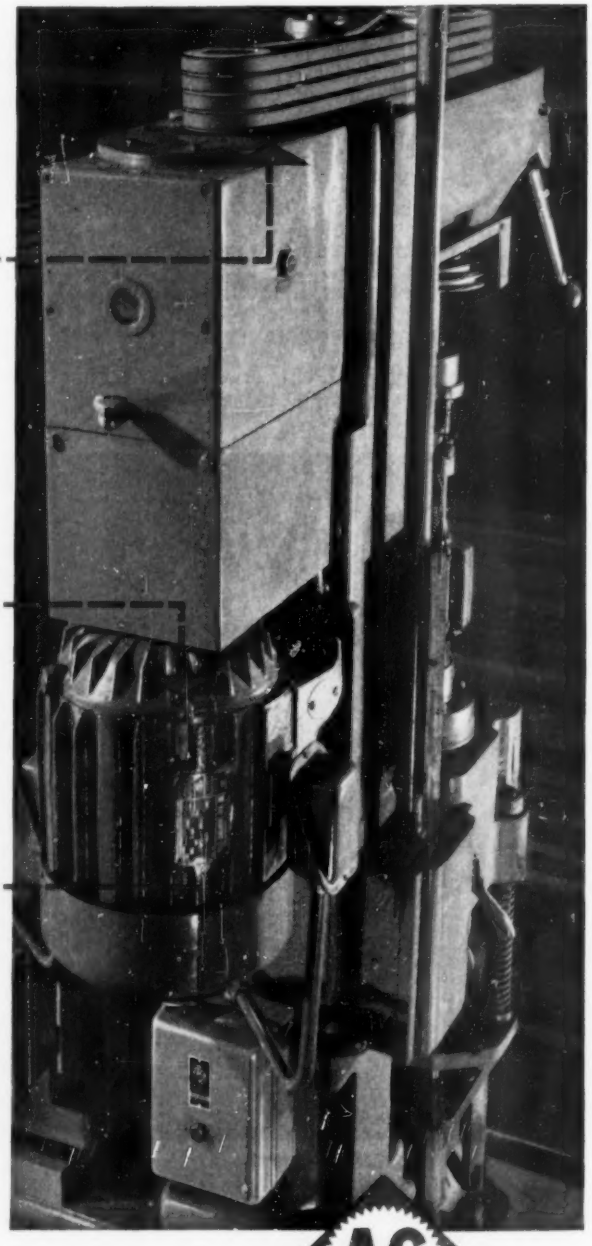
JONES & LAMSON MACHINE CO., 502 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

J&L TURRET LATHE DIV.

Designed to Work Together

Texrope Drives

Texrope V-belt drives, the original multiple V-belt drive, are available in a complete range of types and sizes, both fixed and variable speed. More and more machine designers are finding the moderate cost of *Vari-Pitch* sheaves is returned many times in increased machine versatility and more precise quality control. With either Stationary Control or Motion Control *Vari-Pitch* sheaves, speeds can be accurately adjusted quickly and easily over a wide range.



Motors

The increasingly high cost of maintenance labor has made the use of totally-enclosed, fan-cooled motors on machine tools more popular — and more profitable — than ever. This Allis-Chalmers TEFC motor is especially well suited to this application because it has no enclosed cooling air passages. Since all cooling surfaces are exposed, the motor is easy to clean with cloth, air or vacuum cleaner. Even with the oily atmosphere of many machine shops, dirt wipes off easily.

Motor Control

Allis-Chalmers motor control is available for most designers' applications from size 0 up. Allis-Chalmers builds many types of squirrel cage and wound rotor motor control, dc motor control and variable speed control for many applications. Shown here is a full voltage across-the-line starter with reset button.

Nation Wide Service

Nearly 100 Allis-Chalmers Certified Service Shops throughout the country provide factory-approved parts and service on Allis-Chalmers drive equipment. Complete information on special equipment also is provided.

Get the help of your Allis-Chalmers District Office representative on your drive plans. Call him or write for Bulletins 51B6052, 20B6051, and 14B7733. Allis-Chalmers, Milwaukee 1, Wisconsin.

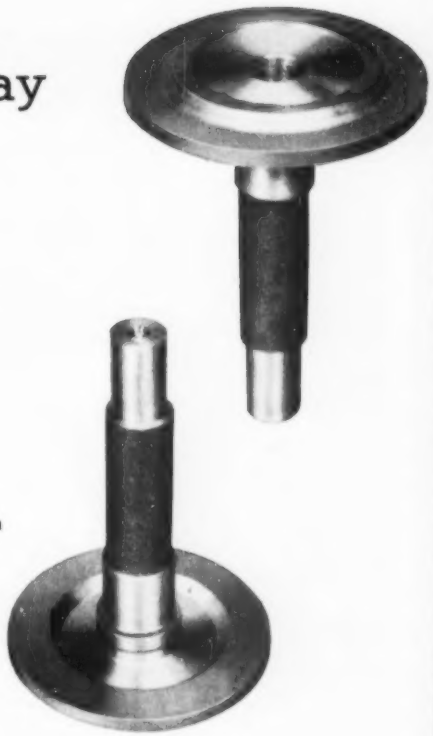
A-4005

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

It took ~~120~~ 29 seconds the ~~old~~ new way



This 5" diam. forged torque converter shaft requires high precision counterbored sections on the outside and inside flange faces.

Previously these operations were done on machines using high speed cutting tools. Two men working at two machines without automatic control of the time cycle performed the operations cited in average time of about 120 seconds each. This method presented quite a problem in *tolerances, time* and *cost.* Then along came the—

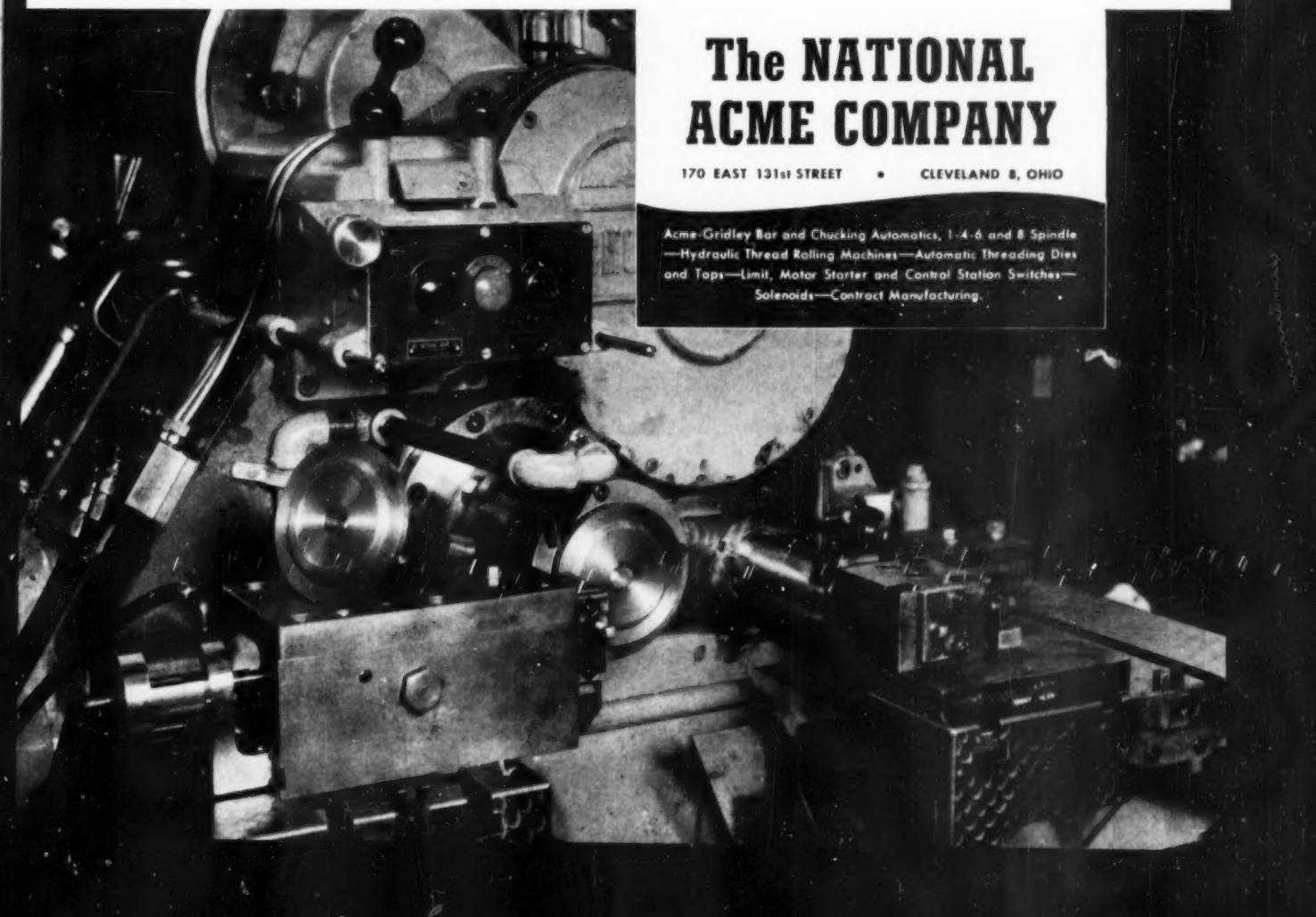
ACME-GRIDLEY
CHUCK-MATIC — *the powerful 12" single-spindle automatic chucking machine*

Two of these Chuck-Matics are now placed side by side, one for counterboring the outside of the flange, the other for the inside. Both employ carbide tipped tools—for cuts as fast as tools can take it; both operate at the definitely controlled cycle time of 29 seconds, and *one man runs both machines.* These facts account for the 4 times faster output.

If you have a chucking problem of tolerances, time, man hours and costs, ask our engineers to show yours how the Chuck-Matic can help solve it—Bulletin SC-46.

REMEMBER: *Industry can't do* **TODAY'S** *job . . . with* **YESTERDAY'S** *tools—and be in business* **TOMORROW.**

Counterboring outside face of flange on 12" Acme-Gridley Chuck-Matic



The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme-Gridley Bar and Chucking Automatics, 1-4-6 and 8 Spindle —Hydraulic Thread Rolling Machines—Automatic Threading Dies and Taps—Limit, Motor Starter and Control Station Switches—Solenoids—Contract Manufacturing.

FROM the package to the shaft — ready, *immediately,* for the job! This is the new "off-the-shelf" availability which Dodge brings to roller chain drives. And, with this new availability, you get the important advantages of the famous Taper-Lock principle, proved in millions of V-belt installations.

No more costly and time-consuming boring of sprockets to fit your shafts! *Taper-Lock bushings are available in a range of sizes for the great majority of industrial applications.* And it's not necessary that shafts be turned and ground to get a tight fit. *Taper-Lock not only is keyed to the shaft, but grips it with the firmness of a shrunk-on fit.* Yet when a sprocket is to be replaced, it comes off easily, quickly. The bushing may be re-used.

Taper-Lock sprockets are compact. They have no flange, and no protruding parts. Taper-Lock occupies no more space on the shaft than standard sprockets. The flush design means safety.

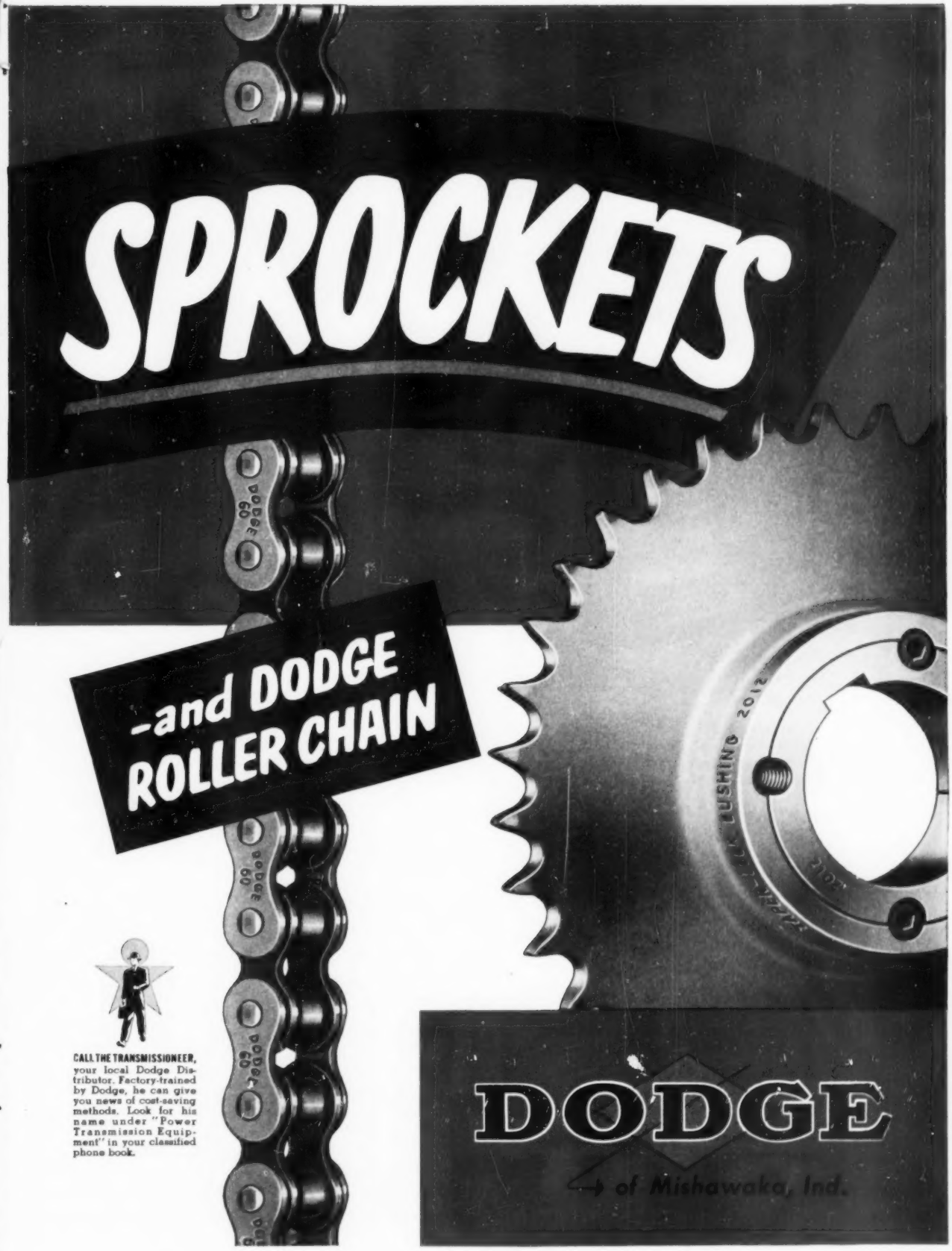
The new Dodge line of roller chain is made to highest quality standards, by craftsmen who know chain manufacture. Both chain and sprockets are made to ASA standards. Taper-Lock sprockets will take any make of American standard chain.

Taper-Lock sprockets will be carried in Distributors' stocks for immediate delivery, in a complete range of B-type steel sprockets—½" to 1¼" pitch. The range in ⅝" pitch, for example, is 12 to 112 teeth.

All bushings and the smaller sizes of sprockets are packaged individually. Dodge roller chain is packaged in 10-foot lengths — and can be furnished in 50-foot and 100-foot reels.

For detailed information about Taper-Lock sprockets and Dodge chain drives write now for Bulletin A-624.

DODGE MANUFACTURING CORPORATION, 100 Union St., Mishawaka, Indiana



CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you news of cost-saving methods. Look for his name under "Power Transmission Equipment" in your classified phone book.

where

MISALIGNMENT

can't be helped . . .

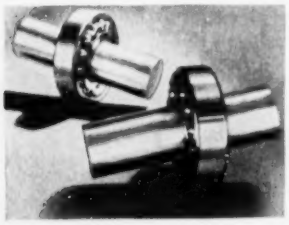
you'll find

SKF

Spherical

Roller Bearings

See how the raceway of the outer ring of this SKF Spherical Roller Bearing forms a section of a sphere. This principle of design of the SKF self-aligning bearings compensates for misalignment due to shaft deflection under load, distortion of the foundation, or other causes.



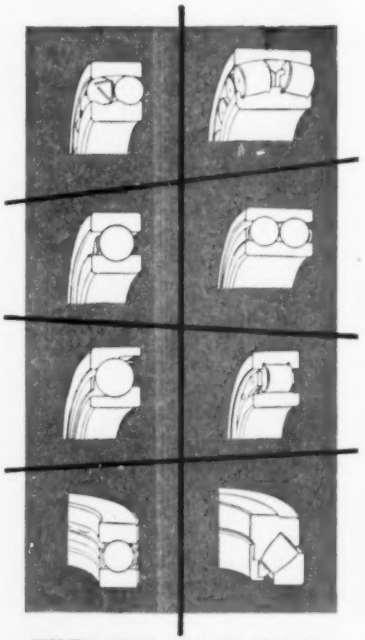
This illustration shows how the principle is also applied to ball bearings, enabling SKF Bearings to operate satisfactorily at high speeds even when some shaft misalignment exists. (The misalignment is exaggerated for clarity.)

Suitable for very heavy radial and thrust loads, SKF Spherical Roller Bearings, like all SKF Bearings, are held well within established tolerance limits, carefully cleaned, protected from rust, and available with cylindrical and taper bores and adapter mountings.

SKF bearings are serving virtually all industry. SKF's unmatched Field and Home Office engineering service helps product designers *put the right bearing in the right place.* **SKF INDUSTRIES, INC.,** PHILADELPHIA 32, PA. — *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.* 7403

SKF®

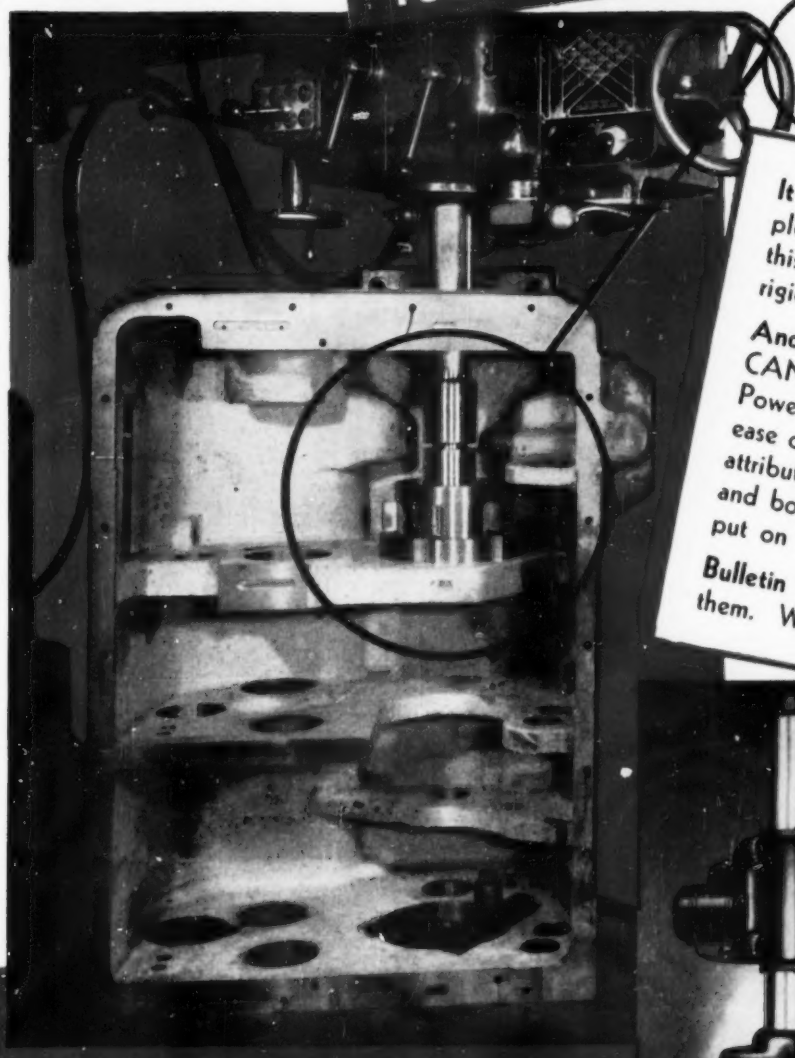
BALL AND ROLLER BEARINGS



SKF'S COMPLETE LINE OF ANTI-FRICTION BEARINGS, PLUS SKF ENGINEERING CO-OPERATION, HELPS YOU *PUT THE RIGHT BEARING IN THE RIGHT PLACE.*

A GOOD SPINDLE

FOR GOOD BORING AND TAPPING . . .

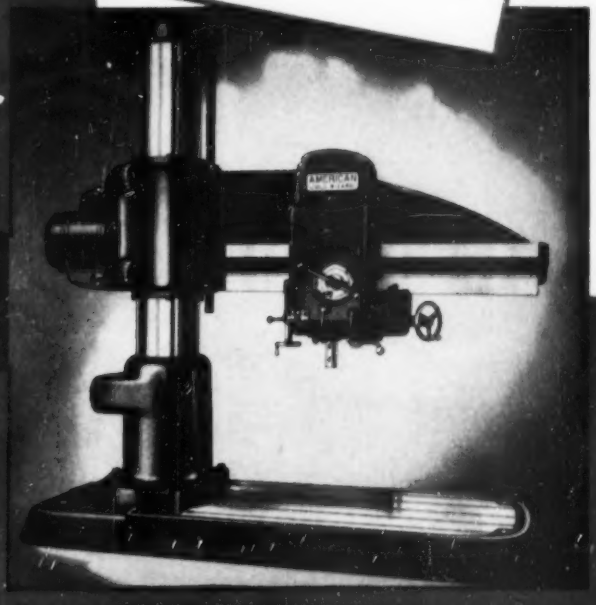


Here's a 10" tapping job on a 5-foot "AMERICAN" Hole Wizard Radial

It takes a sturdy, rigid machine with plenty of power to do work like this. Especially does it require a rigid and smooth-acting spindle.

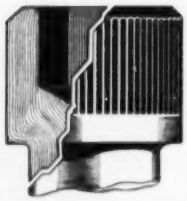
And that's exactly what "AMERICAN" Hole Wizards are noted for. Power—rigidity—convenience and ease of control are "AMERICAN" attributes that cut drilling, tapping and boring costs wherever they are put on the job.

Bulletin No. 327 tells all about them. Want one?

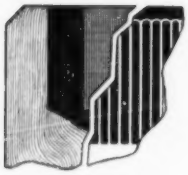


THE AMERICAN TOOL WORKS CO. **Cincinnati.Ohio U.S.A.**

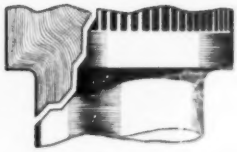
Lathes and Radial Drills



HEAD. Forged for maximum physical strength. Diameter and height are precision controlled — any deviation could be serious. Knurls, originated by SPS, provide easier handling and faster assembly by oily fingers.



SOCKET. Uniform depth and size assure strength and maximum torque in wrenching — extremely important in a socket cap screw.



FILLET. Completely formed to provide maximum resistance to shear and continuous grain flow throughout length of screw.

There's much more to an UNBRAKO than meets the eye

When you pick up a socket cap screw, you don't stop to examine it—it's so commonplace.

If you did, and it's an UNBRAKO, you'd marvel at the knurled head, the uniform hex socket, the smooth shank, the precision threads, all combined to make a strong, close tolerance fastener.

Quality control—from the selected alloy steels to the finished product—makes an UNBRAKO Socket Cap Screw what it is, the finest you can buy. Write for UNBRAKO Standards. SPS, Jenkintown 1, Pa.

UNBRAKO® SOCKET SCREW DIVISION

Stocked and sold by leading industrial distributors everywhere

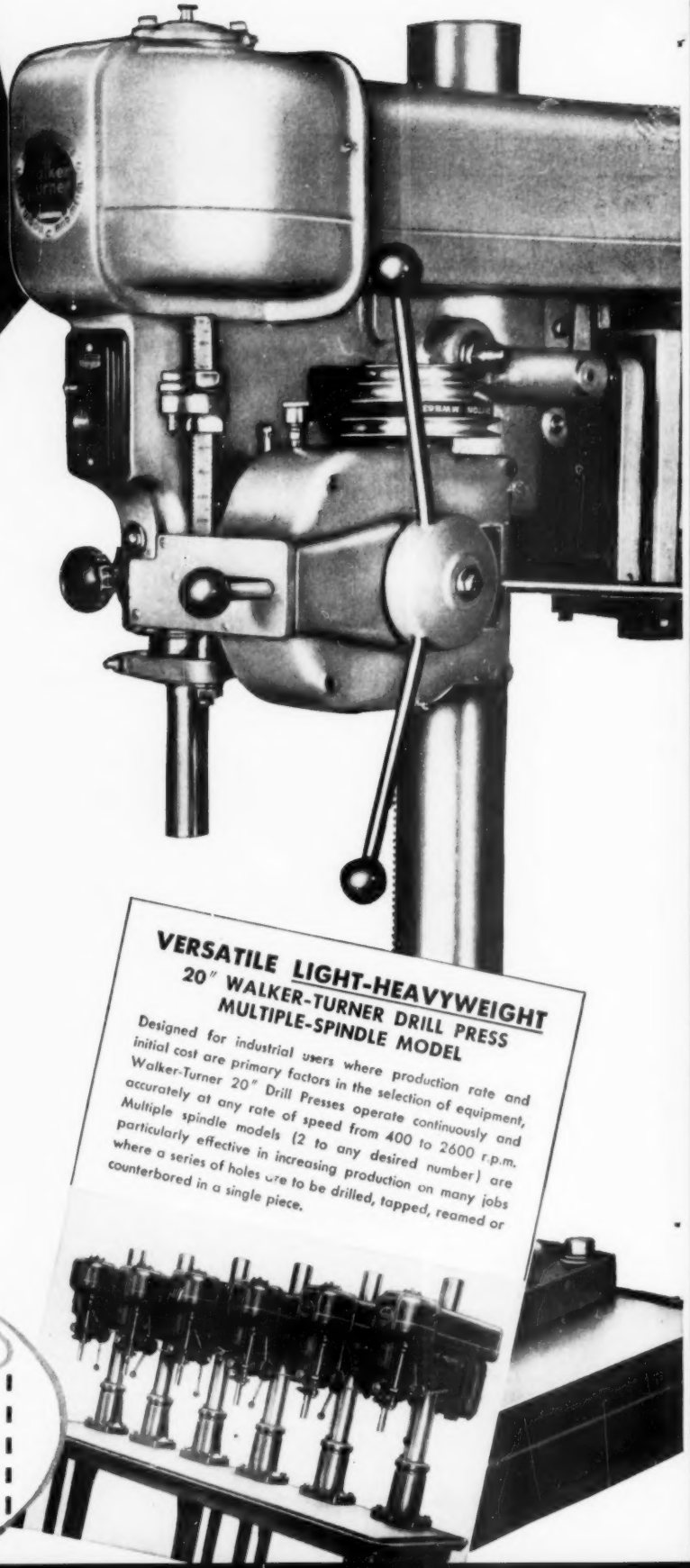
SPS
JENKINTOWN PENNSYLVANIA

THREADS. Fully formed to maintain continuous grain flow and prevent shearing. Made to Class 3 fit. Controlled fillet at root of threads gives added tensile and fatigue strength.

UNBRAKO Standards—as listed in the SPS Catalog—are stocked by leading industrial distributors everywhere.

It's no accident that

they're known as LIGHT-HEAVYWEIGHT Drill Presses



It was done by design— WALKER-TURNER Design

For jobs where neither the capacity nor expense of a heavy industrial machine is warranted, and where a "hobby drill" would be wholly inadequate, Walker-Turner has engineered a special class of Light-heavyweight Drill Presses.

Professional in design and operation, yet light for production machines, this "in-between" line gives industry the needed capacity for short-run production work, without the necessity of heavy investment. Walker-Turner makes 15″ and 20″ Drill Presses (in Bench, Floor, and Production Models), as well as Radial Drills. For complete information, use margin below to write your name and address.

WALKER-TURNER
• DIVISION •
KEARNEY AND TRECKER CORPORATION
PLAINFIELD, N. J.

DRILL PRESSES • RADIAL DRILLS • TILTING ARBOR SAWS
BELT and DISC SURFACERS • METAL-CUTTING BAND SAWS
LATHES • SPINDLE SHAPERS • JOINTERS

SOLD ONLY THROUGH
TRAINED
INDUSTRIAL DISTRIBUTORS

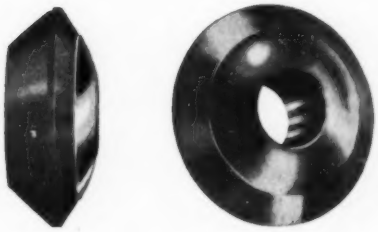
VERSATILE LIGHT-HEAVYWEIGHT
20″ WALKER-TURNER DRILL PRESS
MULTIPLE-SPINDLE MODEL

Designed for industrial users where production rate and initial cost are primary factors in the selection of equipment, Walker-Turner 20″ Drill Presses operate continuously and accurately at any rate of speed from 400 to 2600 r.p.m. Multiple spindle models (2 to any desired number) are particularly effective in increasing production on many jobs where a series of holes are to be drilled, tapped, reamed or counterbored in a single piece.

Use this space

to write for full details and specifications
Walker-Turner Division, Kearney & Trecker Corp.
Dept. AM-5, Plainfield, N. J.
(Please write your name and address in margin of page)

MACHINING FACILITY IS TANGIBLE

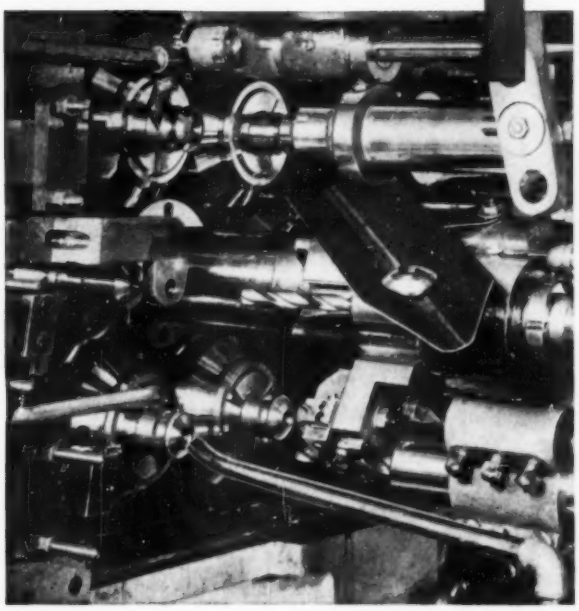


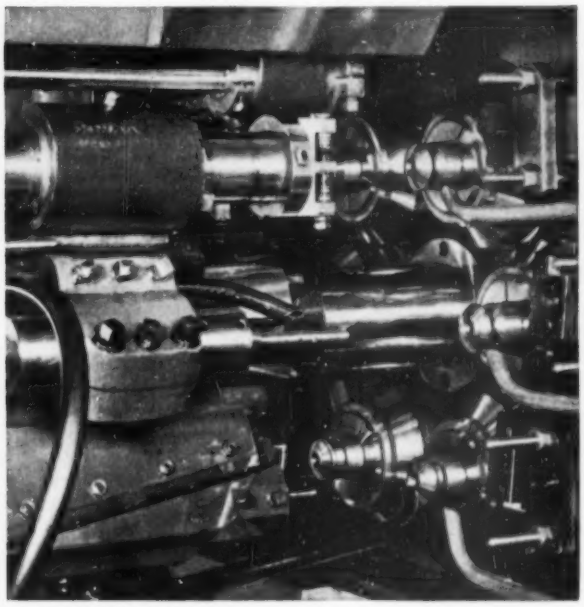
In the production of alloy steel bevel gear blanks on a 2⅝-SIX CONOMATIC, the "all position" endworking attachment facility simplifies the face and hole burnishing operations.

"AUTOMATICS" are good examples of mechanized teamwork. Their main function is to follow through and keep running. But a weak frame, a cramped tooling area, or an inadequate tool support, of one machine alone, can lower the production average of an entire battery.

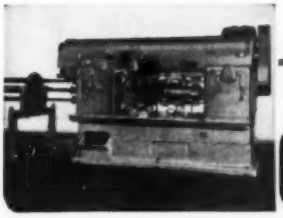
The extra values that pay off in an "automatic" are not just *wished* into the machine; they are *built* there. And only complete information will disclose whether or not they *are* built there. You may have complete information on CONOMATICS.

A Comparison of ALL Automatics is in favor of Cone





FRONT AND REAR SIDES OF TOOLING AREA



Conomatic } CONE AUTOMATIC MACHINE COMPANY, INC. WINDSOR, VT., U.S.A.

DIALIZE and ECONOMIZE

Any AGD Adjustable Limit Snap Gage becomes a DIAL INDICATOR Snap Gage with a STANDARD Dializer

Patented

Simplicity Itself!...

By removing a pair of pins from the snap gage and inserting a STANDARD Dializer any make of AGD Snap Gage in any model, A, B or C, is instantly converted to a DIAL Snap Gage. Dializer is easily transferred from one frame to another.

Dializers are available for complete range of AGD Adjustable Limit Snap Gages (MODELS A, B or C)

No. 1 fits AGD Frames 1 thru 6
No. 2 fits AGD Frames 7 thru 10
No. 3 fits AGD Frames 11 thru 16

No. 3 Dializers also fit larger size frames beyond AGD size range (available from STANDARD) for dimensions up through 26⅝".

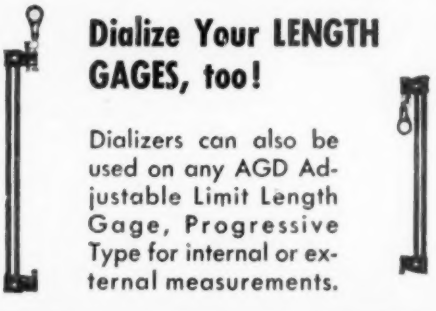
ACCURACY ASSURED by double reed principle.

RANGE OF ADJUSTMENT of gage is unaffected.

INDICATOR either with .0001" graduations and .005" range, or with .001" graduations and .025" range.

We can supply snap gage frames if you do not already have them. Tungsten carbide contact points, anvil blocks and snap gage pins are also available.

Write Today for Your Copy of Catalog C

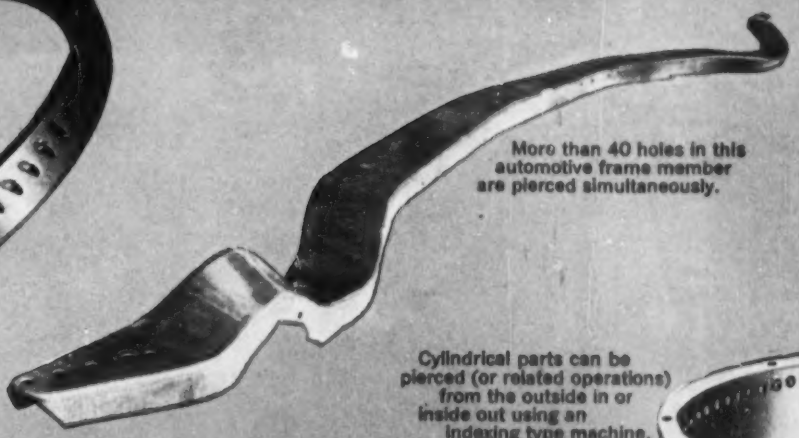


Dialize Your LENGTH GAGES, too!

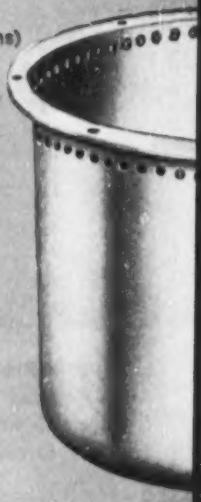
Dializers can also be used on any AGD Adjustable Limit Length Gage, Progressive Type for internal or external measurements.

STANDARD GAGE CO., Inc., Poughkeepsie, N.Y.

Irregularly shaped holes are pierced in this stainless steel jet engine part to very close tolerances—automatically.



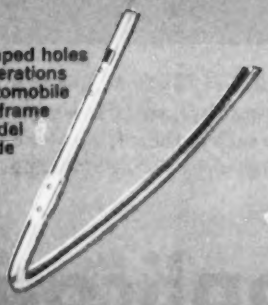
More than 40 holes in this automotive frame member are pierced simultaneously.



Cylindrical parts can be pierced (or related operations) from the outside in or inside out using an indexing type machine.

High Production Piercing...

IN A SINGLE SET-UP



Seven irregular shaped holes and two trimming operations complete this automobile door inner window frame in one setup. Model changes can be made at little expense.

Based on a recent development in piercing technique, you can pierce more holes simultaneously—faster and with greater accuracy—on Danly Metalworking Equipment. Eliminate awkward multiple handling . . . pierce all holes faster in a simple, single set-up.

Built specifically for your piece part, these are only a few of the advantages of Danly Hydraulic Metalworking Equipment:

FREE

Write for this Bulletin today!

Consider these important features!

- ***HIGH CAPACITY***—Up to 225 tons available per cylinder.
- ***BREAKTHROUGH SHOCK PRACTICALLY ELIMINATED***—Permits greater capacity without hydraulic circuit or tool trouble . . . smoother, faster.
- ***AUTOMATIC STRIPPING***—An integral feature of every cylinder . . . each station hydraulically strips its punch. This unique action simplifies fixturing, is practically foolproof.
- ***ACCURACY, FLEXIBILITY***—Pierces practically any type of hole . . . round, oblong or irregular to very close tolerances.

DANLY

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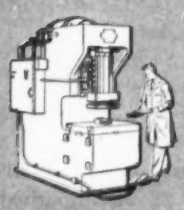
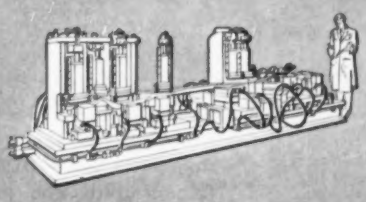
HYDRAULIC METALWORKING EQUIPMENT
MECHANICAL PRESSES . . . 50 TO 3000 TONS

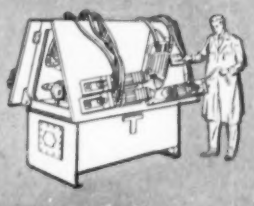
DANLY HYDRAULIC METALWORKING EQUIPMENT



General Purpose Gap Frame Piercing Press

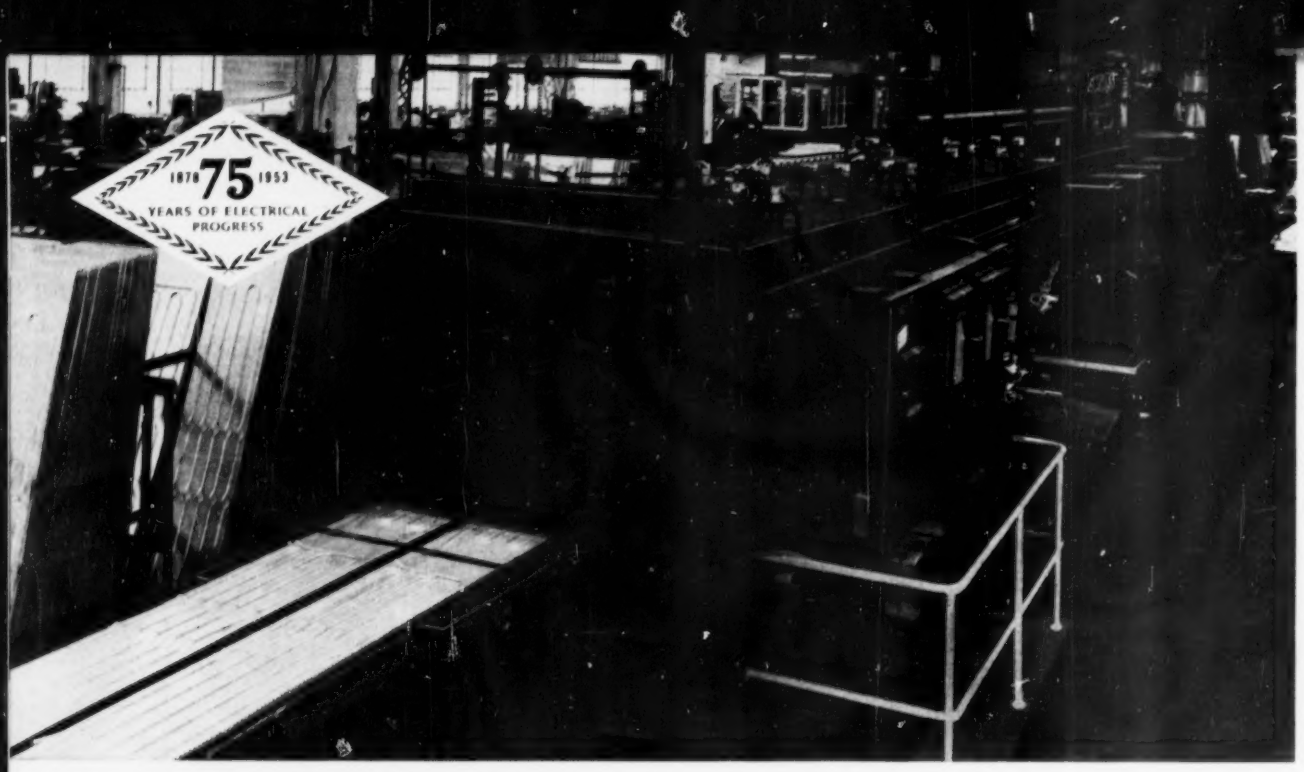


Automotive Frame Piercing Machine



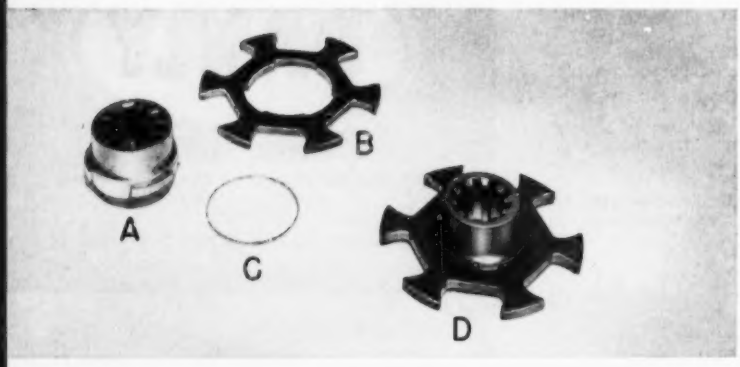
Automotive Inner Window Frame Piercing Machine

Jet Engine Shroud Ring Piercing Machine

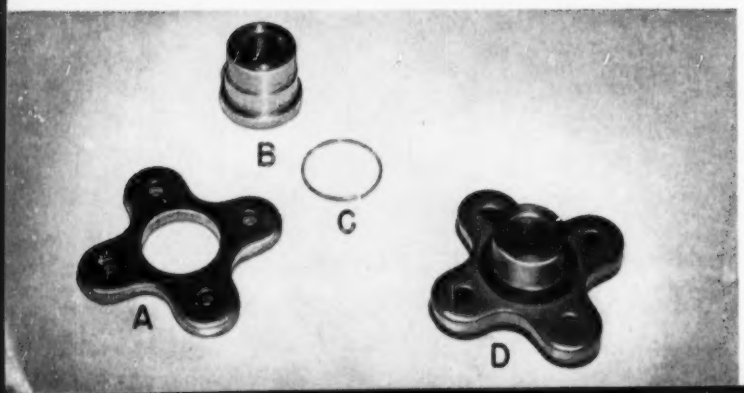


1 **FURNACE BRAZING ALUMINUM ALLOYS** offers you many advantages: (1) cost is lower than either gas or arc welding, (2) brazed parts have a neater finish, (3) furnace brazing is easily adaptable to production line methods, and (4) sections too thin for welding can be brazed successfully. An increasing number of aluminum assemblies such as the refrigerator evaporators above are being fabricated by furnace brazing.

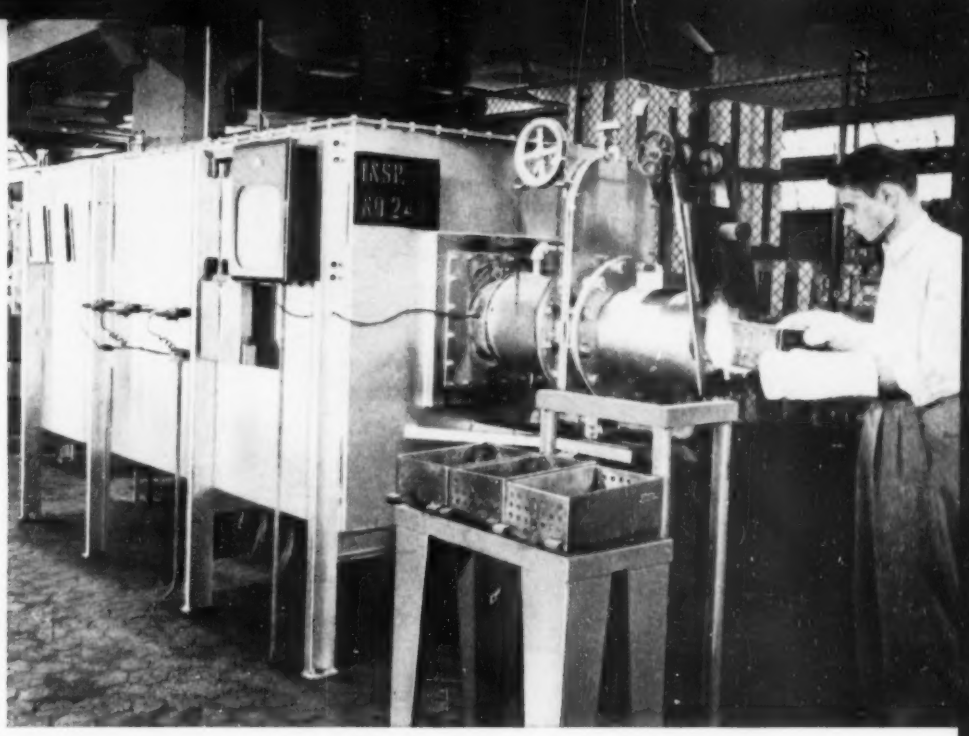
Five Brazing Applications



3 **SAVINGS OF 15 CENTS EACH** are reported on the fabrication of this clutch hub by furnace brazing. When formerly forged the assembly required expensive machining on the flange. For furnace brazing the operations are simple. The splined hub A is assembled with the punched flange B made from black hot-rolled steel, with the copper ring C placed at the joint. The hole in the flange is simply punched, with no reaming or broaching operation necessary. Serviceability of the furnace-brazed assembly is reported to be excellent.

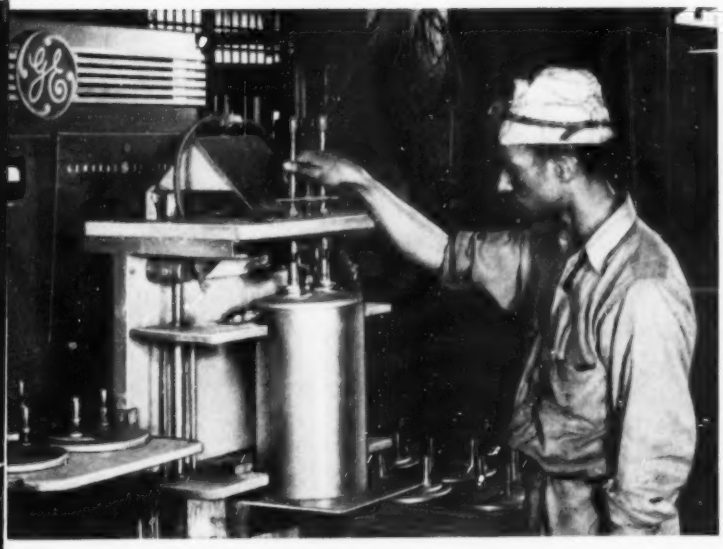


4 **SAVINGS OF 66% IN MATERIAL** and 2½ cents on each pulley are the result of fabricating this assembly by furnace brazing. When formerly forged the part was cut from a section of bar stock about 2¾ in. in diameter and weighing about 1½ lbs. Now, in furnace brazing, parts made from blanks weighing only ½ lb are used. The process is accomplished by brazing punching A to screw machine part B with copper ring C to form assembly D.



2 BRIGHT BRAZING STAINLESS STEEL without flux in this semi-continuous furnace eliminates the characteristic green chromium-oxide and flux deposit. Because parts come out bright and shiny, no cleaning operations are necessary. Stainless assemblies such as the jet engine parts shown at left before and after brazing are brazed in protective atmospheres of pure dry hydrogen or dissociated ammonia in metal retorts.

That Can Save You Money

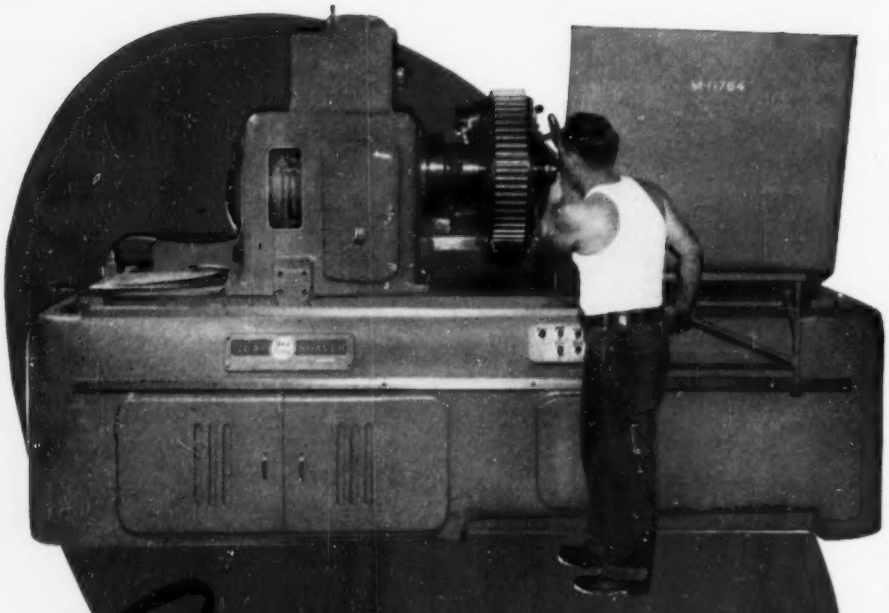


5 INDUCTION HEAT FOR SILVER BRAZING stainless steel helps this user increase production 50%, reduce rejects, eliminate leakers, and get uniformly stronger joints. Here, an operator brazes two stainless-steel nipples at a time into the stainless-steel head of a heater tank. Savings of 25% in silver solder are made possible with induction heat. Formerly, hand torches were used to perform this operation with non-uniform results and considerably more rejects.

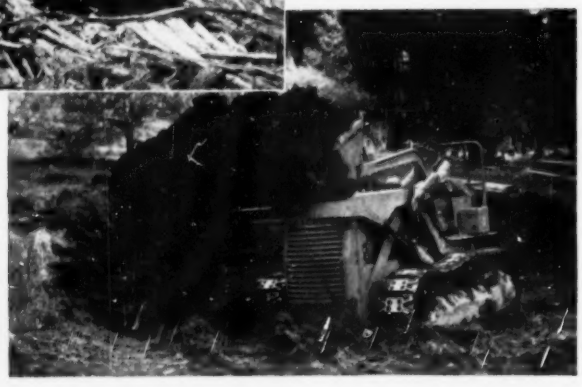
For more information on how to apply brazing to your operations, contact the Heating Specialist in your nearest G-E Apparatus Sales Office. His years of experience involving every type of heating installation will be useful to you in solving your heating problems. General Electric Company, Schenectady 5, New York. 720-103

You can put your confidence in—

GENERAL ELECTRIC



Caterpillar gears HAVE GOT TO BE GOOD!



● The unpredictable nature of tractor service, its frequent and unavoidable severity, leave no alternative to gear specifications of the most rigid character including close dimensional tolerances.

Furthermore in order to attain maximum gear service life and avoid critical "end bearing" due to slight changes in alignment under sudden overloads, the drive gear teeth are shaved to the Elliptoid (crowned) Form.

In a recently published article on Caterpillar gear production, reference was made to gear shaving as an important factor in production economy. "Shaving not only controls dimensional characteristics of our gears, correcting gear-cutting errors and producing quiet running tooth surfaces, but also eliminates final lapping operations which were essential before shaving was adopted."

If you have to meet rigid gear specifications investigate Red Ring Gear Shaving. It delivers Precision with Economy.

6144

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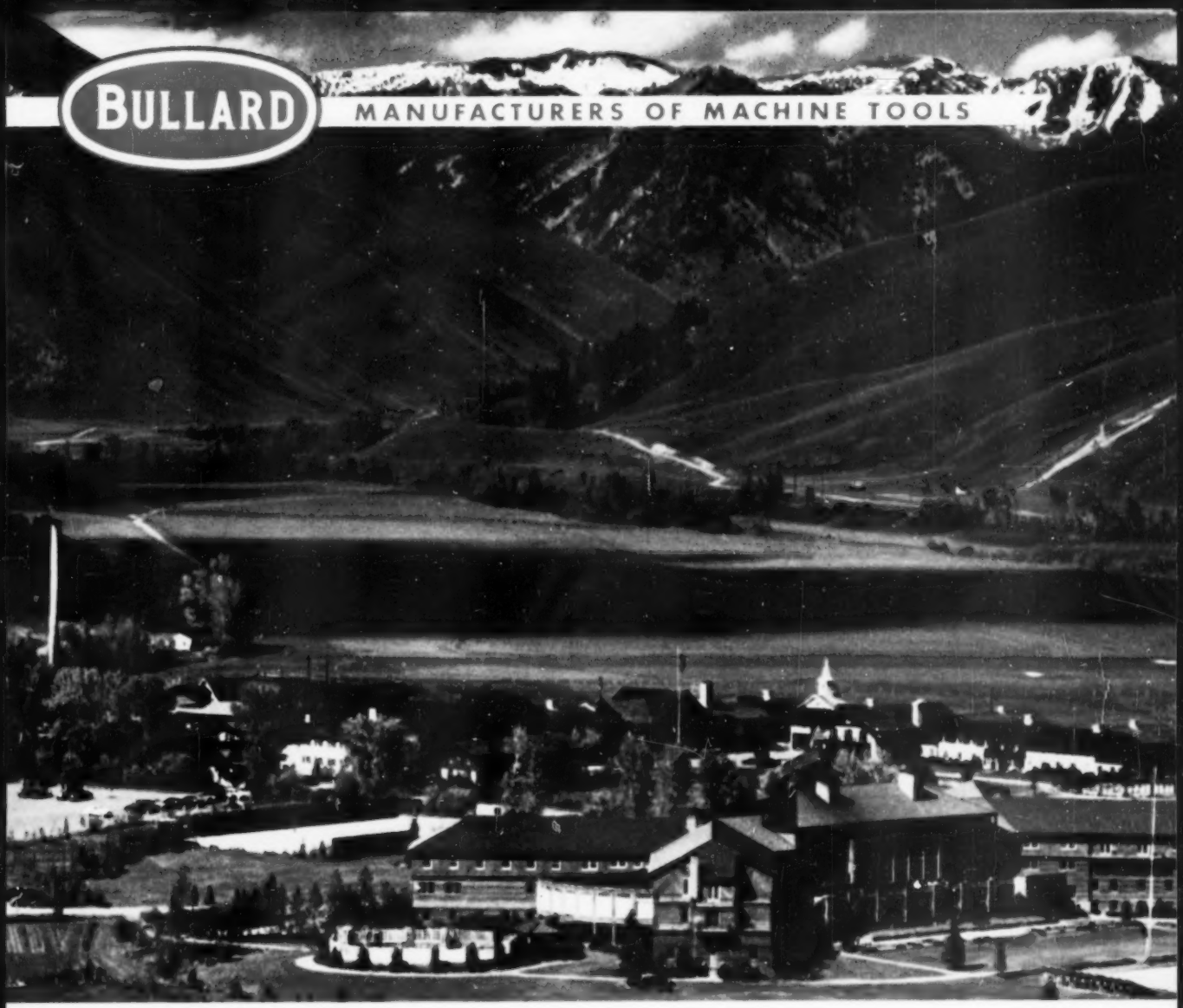
WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

BULLARD

MANUFACTURERS OF MACHINE TOOLS



A Sportsman's Paradise — Sun Valley, Idaho

Wide World Photo

The Invisible Background of Industrial Progress

Sun Valley, Idaho, where this awe inspiring view was taken, offers more than 27 different sports to the thousands of people who visit it each year. Eight mechanically operated chair lifts carry guests to the four surrounding mountains. The highest of these, Baldy Mountain, reaches a total of 3,200 feet above the valley floor. Here a breath-taking panorama of the area unfolds. In some of the mountain areas the chair lifts provide the only means of transporting material, food and supplies as well as the guests to the summit.

Many beauty spots are now being enjoyed more than ever since they have been made accessible by modern transportation facilities.

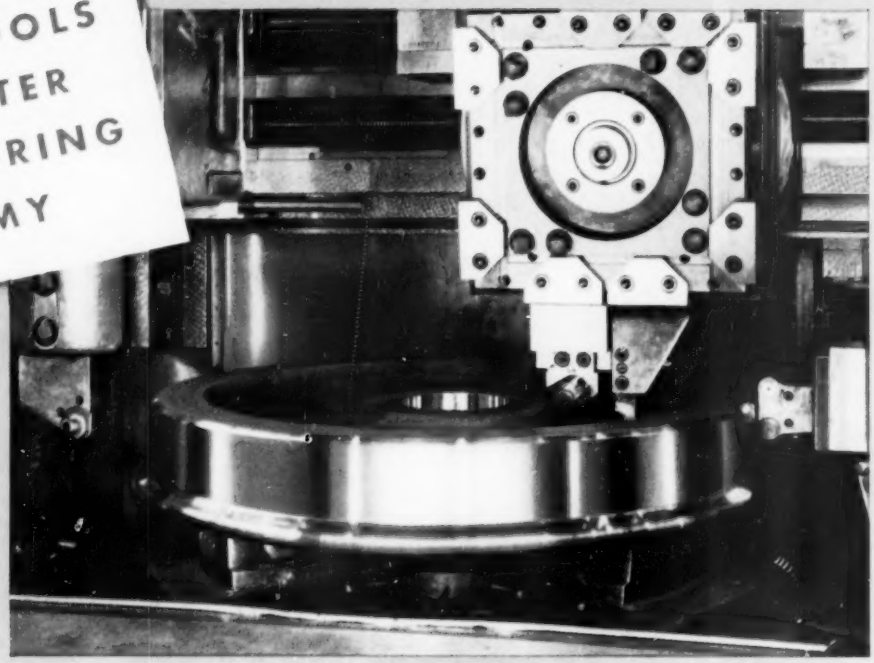
* As manufacturers of *Modern Machine Tools*, The Bullard Company is proud of its part in the research, engineering and development of accurate, rugged, dependable, versatile, and economically operated machines that have helped build and maintain the American transportation system.

* *For greater manufacturing economy* **REFER** *to next page*

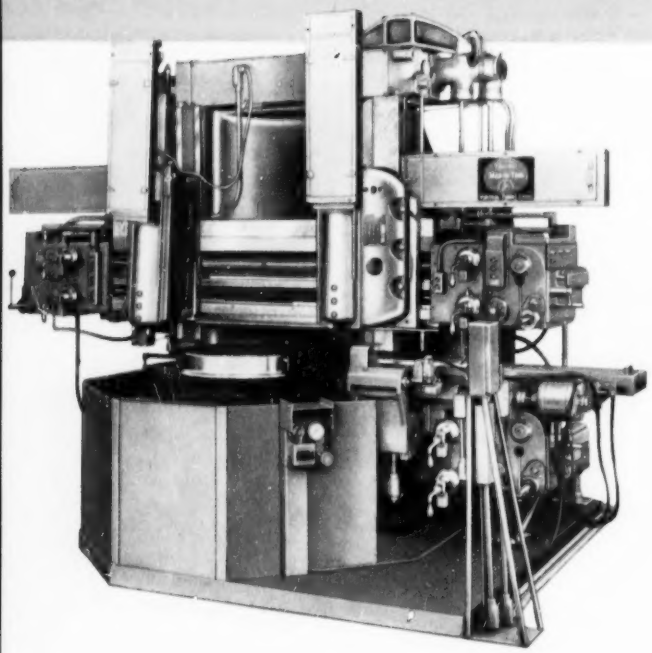
THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

BULLARD MACHINE TOOLS FOR GREATER MANUFACTURING ECONOMY



Bullard Man-Au-Trol Car Wheel Lathe on production of Diesel Locomotive Wheels. One of many now installed for the production of Railroad Locomotive and Car Wheels.



Man-Au-Trol with manual or automatic control has taken the guess work out of the previous manual operations on highly accurate repetitive work.

Automatic change of feeds and speeds at the proper instant, automatic change of direction of feed, automatic precision index of heads for succeeding operations, automatic operation of the heads through their entire cycle of operation, all contribute to the productive efficiency and minimum operator fatigue, at a pace previously unobtainable with single spindle machines of the size and capacity of Man-Au-Trol.

BULLARD

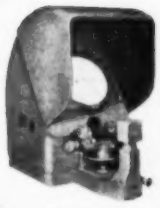
Complete information on request.

THE BULLARD COMPANY BRIDGEPORT 2, CONNECTICUT

11 MODELS

3 SCREEN SIZES

Pedestal Type
14" Diam. Screen



Bench Type
14" Diam. Screen
4 Models

Bench Type
5⅜" x 7¾" Screen
3 Models

Unsurpassed Inspection Versatility

JONES & LAMSON OPTICAL COMPARATORS

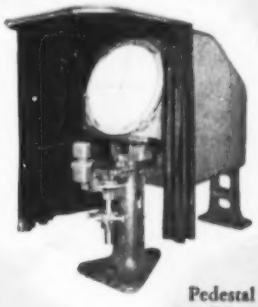
The Essence of Quality Control

Jones & Lamson Optical Comparators are designed and built like rugged machine tools to withstand vibration and hard use. Yet they have the built-in accuracy to satisfy the most exacting laboratory standards.

- **They meet** the requirements of toolroom, laboratory and production inspection.
- **They precisely measure** height, depth, lead or spacing, as well as angles to degrees and minutes. They will measure to .0001".
- **They compare** intricately contoured parts with a master outline—and measure the amount of error.
- **They are convenient** to operate, easy to set up and read direct—*without computation.*
- **They operate** under normal lighting conditions. *No darkroom is needed.*
- **They will photograph** the enlarged shadow and record its relationship to a master chart.
- **Several persons** may study the shadow *at the same time.*
- **They will inspect** and measure surface contours, as well as profiles of objects such as type faces, stamping dies, punches, worn tools, etc.

Vertical Type
14" Diam. Screen

Direct
Projection
Type



Pedestal Type
30" Diam. Screen

P.S. A complete line of STANDARD CHARTS and FIXTURES is maintained by us.

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Machine Tool Craftsmen Since 1835

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Please send Comparator Catalog No. 402.

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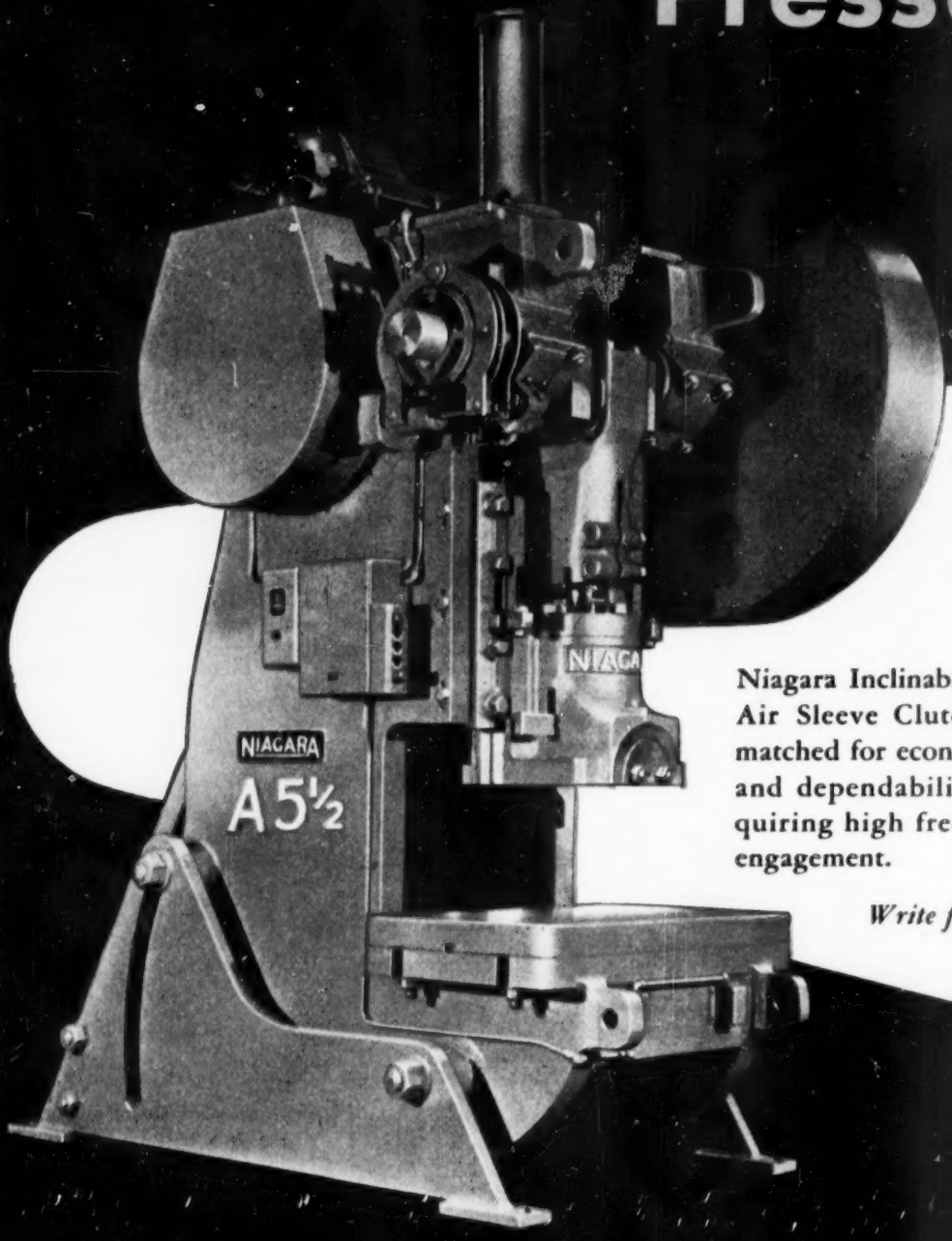
NIAGARA Inclinable Presses



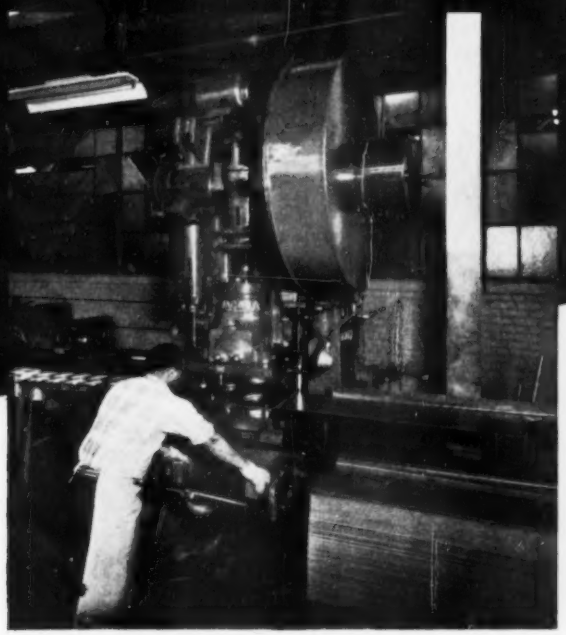
Niagara Inclinable Presses with Air Sleeve Clutch cannot be matched for economy, efficiency and dependability on jobs requiring high frequency clutch engagement.

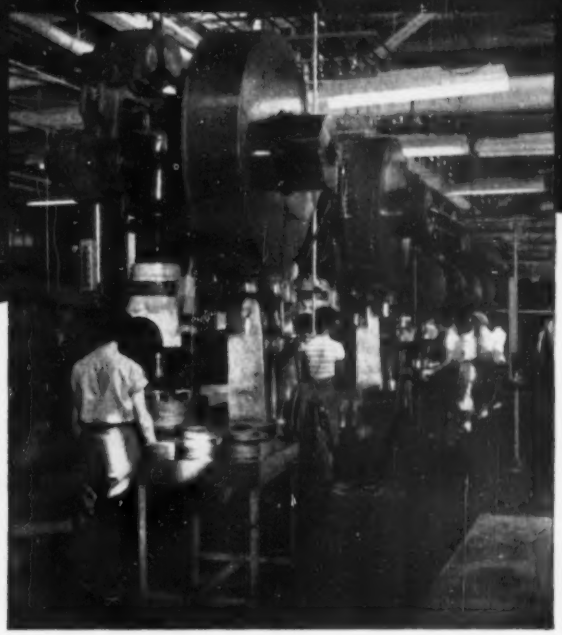
Write for information.

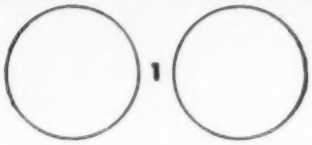
NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

On the Production Line

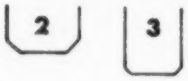
AT SHWAYDER BROTHERS, INC., DETROIT



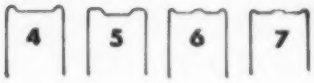




1. Punching two round blanks per stroke on Niagara A-5½ Press with Air Sleeve Clutch.

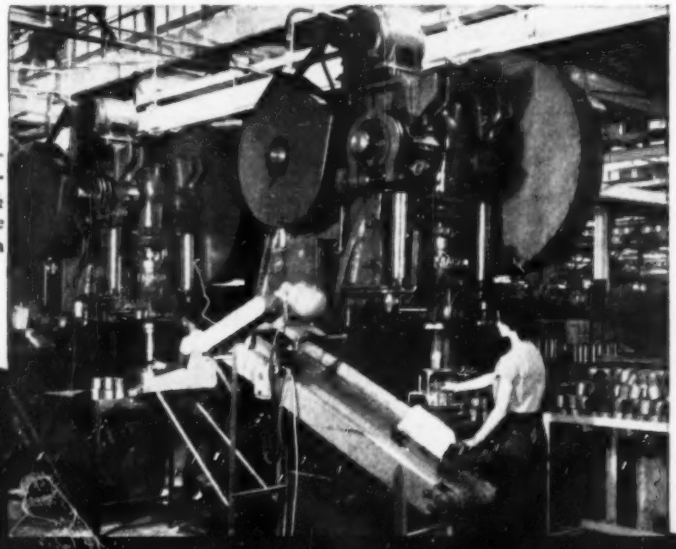


2, 3. Cupping and Redrawing on A-5½ Presses with Air Sleeve Clutches.



4, 5, 6, 7. Indenting end on A-3½ Presses.

8, 9. Forming hexagonal shape and Ironing side wall on A-5½ Presses with Air Sleeve Clutches and with Niagara Cushions.



The final piercing and tapering operations are done on A-3½ Presses (not shown.)

NIAGARA

America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

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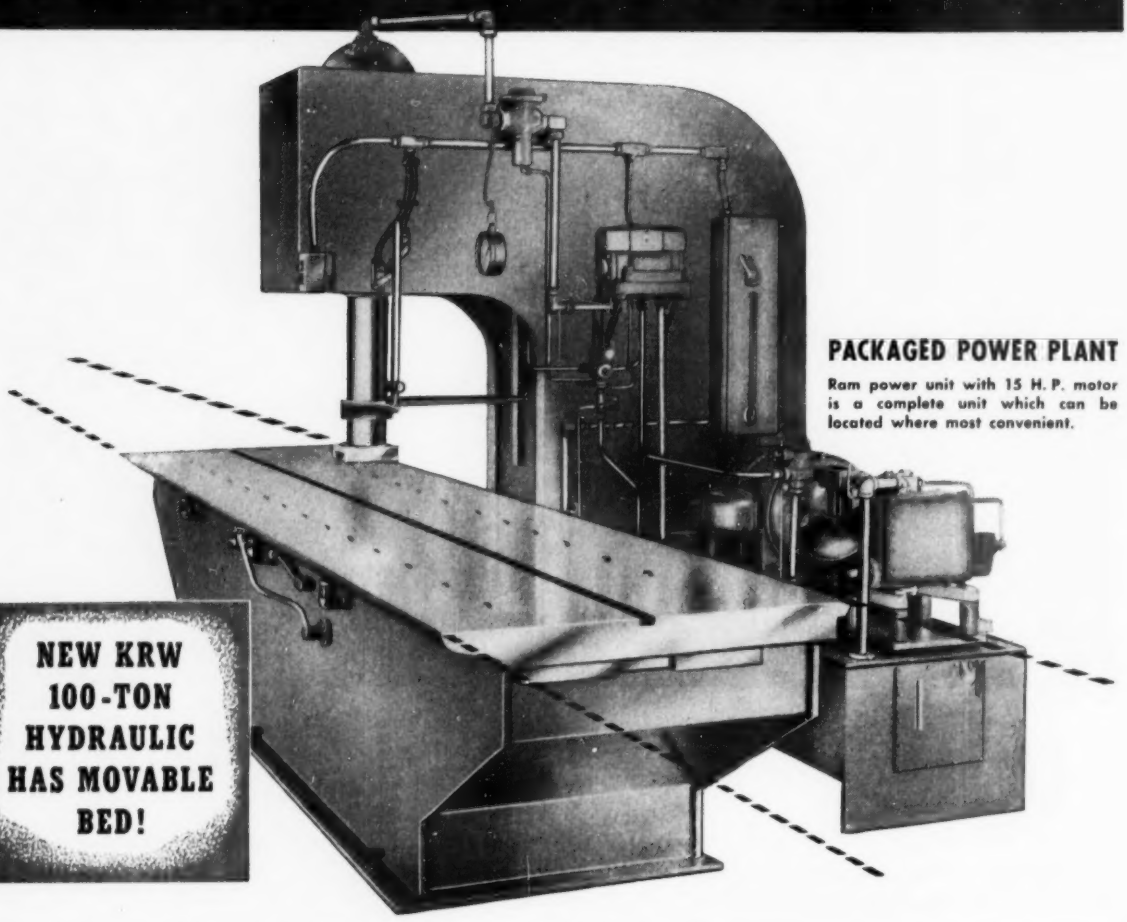
NEW PRESS BRINGS THE WORK TO YOU!



PACKAGED POWER PLANT

Ram power unit with 15 H. P. motor is a complete unit which can be located where most convenient.

NEW KRW 100-TON HYDRAULIC HAS MOVABLE BED!

Here's KRW's newest time-saver! It's a 100-ton Hydraulic Press with an extra-long 16 foot bed that moves more than 3 feet in either direction. Now being used for important straightening work by some of America's largest manufacturers of airplane forgings. Due to the extra-long movable bed, straightening work on large pieces can be accomplished with greater facility and speed. Ideal for manufacturers and fabricators of extra-long parts that require straightening work. Press bed has independent motor drive. Hydraulic motor doesn't have to be running to move the press bed back and forth.

This new KRW press has a unique load-control feature. An applied ram load can be maintained at any pressure setting from 10 to 100 tons without holding manually controlled lever at applied position. Operator can bring ram load to desired tonnage and remove hand from control lever. Lever automatically returns to neutral but applied load will be retained until manually controlled lever is moved to reverse position for lifting ram. This feature saves time on straightening jobs where it is necessary to hold a given pressure for periods of time.

KRW also makes a full line of one, two and three cylinder Hydraulic Presses, hand, air or motor driven; 25-150 ton capacities. Write for details and prices on this or any KRW Hydraulic to Dep't. 11.

SPECIFICATIONS

CONSTRUCTION Cylinder—chrome-nickel-molybdenum steel; C-frame and bed, weldment fabrication; Table, steel.

TABLE CONTROL Separate push buttons for right and left movement. Table stops when manually applied push button is released.

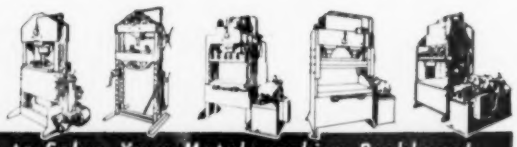
SAFETY PROVISIONS Electrical System—disconnect switches, automatic and manual.

Hydraulic System—pressure relief valves eliminate danger of overload in any part of the Hydraulic circuit.

Table and Ram travel is limited by safety switches. Manually adjustable stop limits up-travel of ram.

K·R·WILSON

215 MAIN ST., BUFFALO 3, N. Y.



Designers and Builders of the Right Hydraulic Press to Solve Your Metal-working Problems!

High Precision, Reliability, Top Performance

SCHAERER

MODEL UN-450

Heavy Duty Lathe

SCHAERER MODEL UN-450
HEAVY DUTY COPYING LATHES.

Twin cross slides. Copies from cylindrical or flat template either longitudinally or cross. Twin slides permits rough turning and finish turning in the same operation in many instances. Swings 17-3/4" over bed, 9" over carriage,, 20-5/64" over gap. Center distance 60". Spindle speeds 31.5 to 1400 R.P.M. Hydraulic copying attachment can be removed to permit use as a regular twin slide lathe when necessary. 10 H.P. motor drive to spindle. Separate motors for coolant and hydraulic pump. A production lathe built to tool room standards.

OUTSTANDING FEATURES

Copies simultaneously in 2 directions; 49 longitudinal and cross feeds; All gears in headstock hardened and ground; Automatic carriage release when overloaded; Separate oiling systems for front and rear end bearings; Ball stop catch on cross slide guarantees accurate depth adjustment for thread cutting; Adjustable carriage stop for longitudinal turning.

- *Guaranteed Service by Trained Staff*
- *Engineering Staff will make recommendations based on your requirements*
- *Spare Parts in Stock*
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Many More Machines for Every Operation

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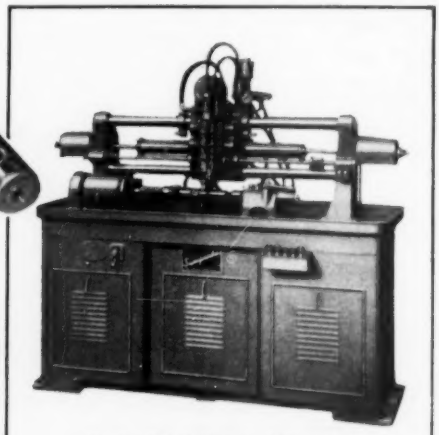
SUPERFINISH
MAKES THESE PARTS BETTER
. . . 5 WAYS!

You're looking at a group of parts that go into the Gisholt Fastermatic Automatic Turret Lathe. Super-smoothness of working surfaces of these parts is vital to the precision and long life of the machine. So all these parts are Superfinished—including overhead pilot bars, piston rods, hydraulic control valves, thrust collars, turret locating pins and rollers.

The benefits are many:

1. Superfinishing removes all chatter marks, grinder flats, "smear metal" and other surface irregularities.
2. It assures more nearly perfect geometrical forms. This means more uniform bearing surfaces. They therefore last far longer.
3. Superfinishing simplifies assembly because the surfaces are down to true "base metal"...and no break-in tolerances are required.
4. Superfinishing simplifies grinding and reduces spoilage.
5. The greater degree of smoothness makes the parts easier operating, reduces wear.

The net result of Superfinish here—as it can be in your case—is parts that perform better, last longer and cost far less in the long run. See how Superfinish can solve your problems of both wear and surface roughness. Get your copy of "Wear and Surface Finish," and complete textbook covering all phases of Superfinish.



Model 52-A General-Purpose Superfinisher

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT

GISHOLT MACHINE COMPANY Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Cut Costs and Increase Efficiency with

HELLER

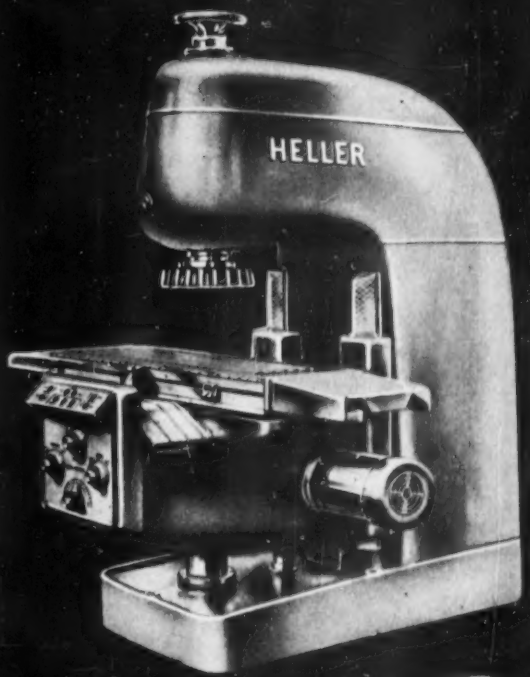
PRODUCTION MILLING MACHINES

HELLER knee type milling machines are available in either horizontal or vertical construction for use with carbide cutters for heavy milling work.

They are rigidly built for the heaviest production milling with powerful drive units with 18 speeds to a roller bearinged spindle.

The control is through push button selection and machines can be furnished standard or equipped with full automatic cycling control or with copy milling control through electro-hydraulic feeler.

Importing Heller Machines Since 1926



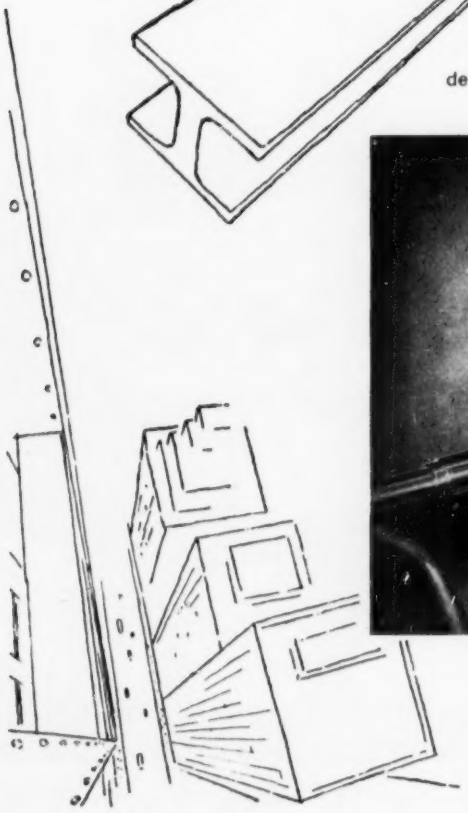
HELLER MACHINE CO., 114 Liberty St., New York 6, N. Y.

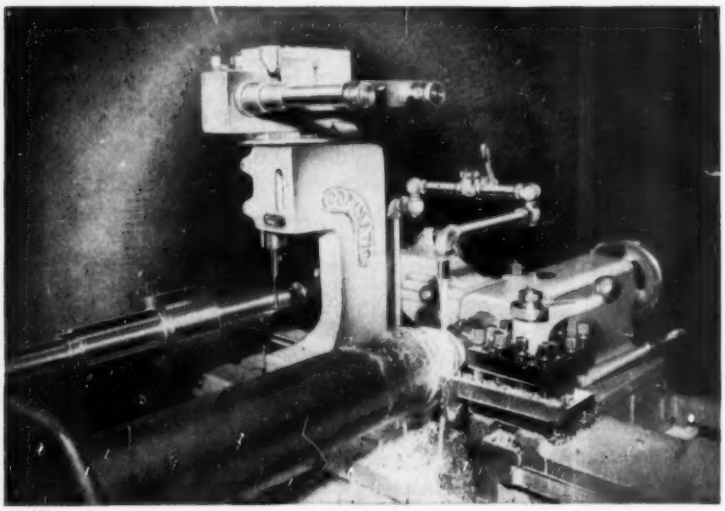
How HIGH is UP ?

Production soars "up and up" with COPY-MATIC Lathes! Case histories prove it!

At the D. O. James Gear Mfg. Co., Chicago, Lodge & Shipley Model X COPYMATICS are beating the output of former lathes by "2 to 3 times" consistently. This customer reports "anything that is turned on a standard lathe" is produced by their COPYMATICS faster and at lower cost. Time saved runs up to 66⅔!

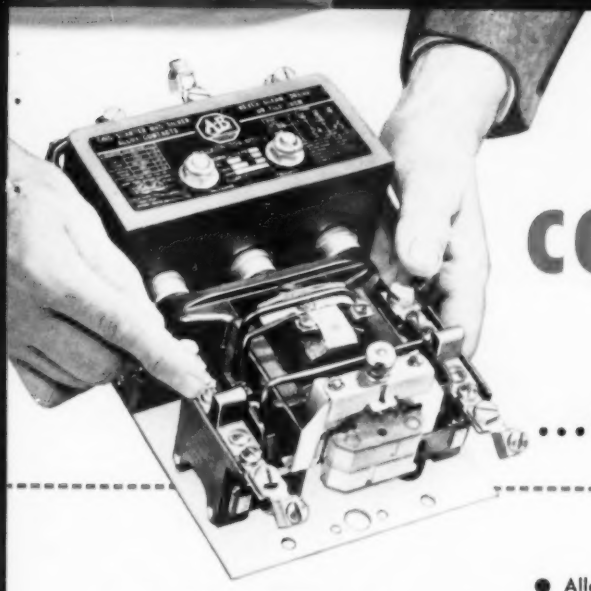
It costs nothing to submit your toughest job. Write for literature and detailed case histories.





THE **Lodge & Shipley** COMPANY

3059 COLERAIN AVE. CINCINNATI 25, OHIO



for COMPLEX CONTROL LAYOUTS

use A-B Solenoid Switches

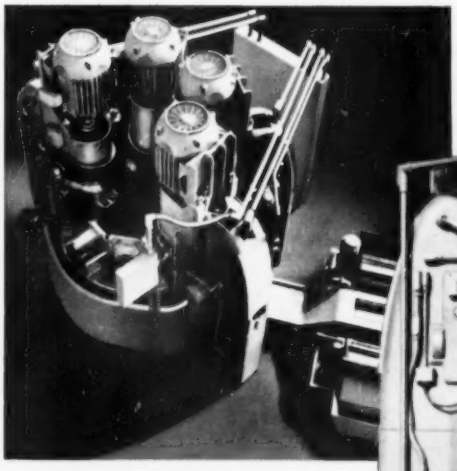
...they are SIMPLE • COMPACT • TROUBLE FREE

OVERLOAD PROTECTION

Accurate thermal relays protect the motor against sustained overloads. Their accuracy and dependability are not affected by long inactivity. Be safe with Allen-Bradley starters.

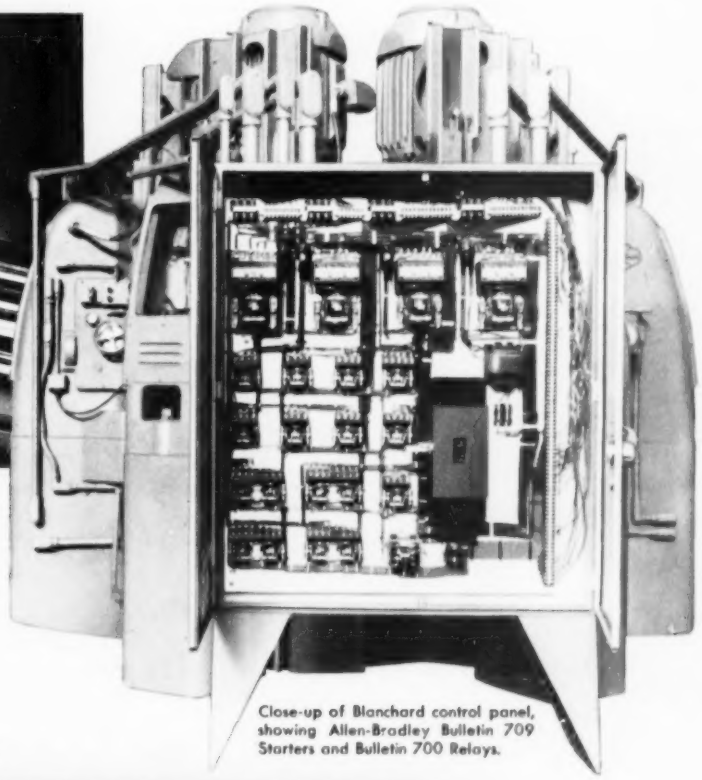
● Allen-Bradley pioneered the development of the SIMPLEST ... and therefore the MOST RELIABLE ... starting switch in the world. It is the Bulletin 709 Solenoid Starter ... the switch with only ONE moving part. There are no troublemaking gadgets like pins, pivots, bearings, or jumpers. And it is exceedingly compact, which permits close groupings on control panels.

Machine tool builders use Allen-Bradley solenoid starters and relays for their control panels, because they are consistent in action and so trouble free. Follow their example, and standardize on Allen-Bradley solenoid controls.



AUTOMATIC GRINDER CONTROL

As work passes through this Blanchard 4-spindle surface grinder, the automatic caliper control adjusts the grinders to limits as low as 0.0005 inch. Allen-Bradley trouble free solenoid controls are used throughout.



Close-up of Blanchard control panel, showing Allen-Bradley Bulletin 709 Starters and Bulletin 700 Relays.

Allen-Bradley Co.
1316 S. Second St., Milwaukee 4, Wis.

ALLEN-BRADLEY
Quality
SOLENOID MOTOR CONTROL

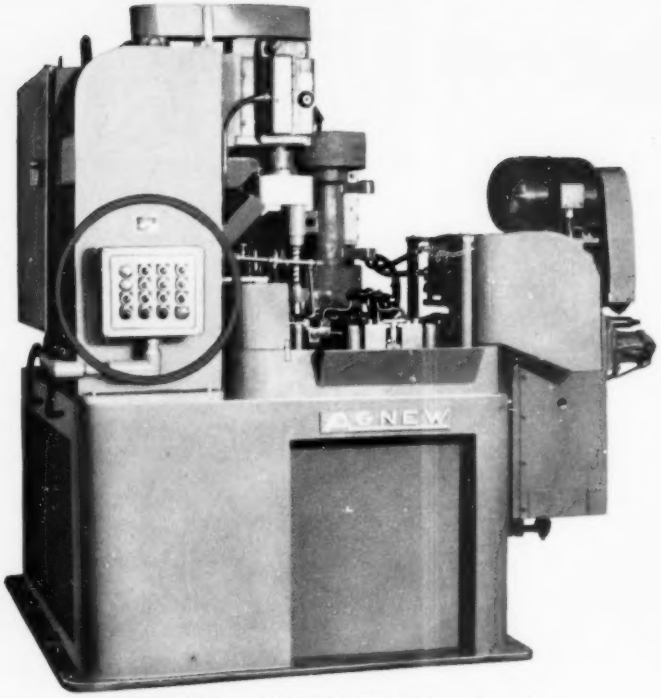
A-B Quality

5-53-R

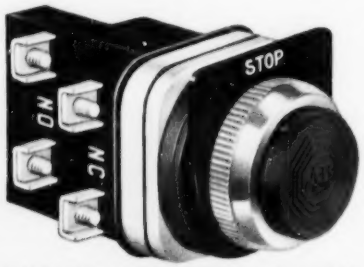
BULLETIN 800T OILTIGHT STATIONS

for concentrating control where most convenient

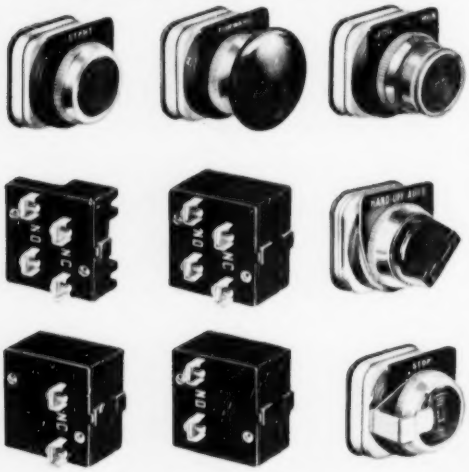
The 15-button control station, shown below, is a typical oiltight master station equipped with Allen-Bradley push buttons. Any combination of standard buttons can be assembled in these stations. Over 40 name plate designations are available.



Agnew Milling Machine with Allen-Bradley oiltight master station.



BULLETIN 800T PUSH BUTTONS



CONTACT BLOCKS—OPERATORS

Allen-Bradley Bulletin 800T Push Buttons consist of two parts —the *contact block* in several different contact combinations, and the *operator* furnished with various types of buttons. These units may be assembled in a large variety of combinations to fit any special requirement.

OILTIGHT PUSH BUTTONS

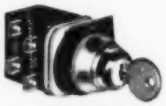
for Machine Tool Applications

Oils, cutting fluids, and grease cannot penetrate the double synthetic rubber seals between the push button operators and the contact mechanisms of Allen-Bradley Bulletin 800T Push Buttons. Consequently, long, trouble free operation can be guaranteed.

Bulletin 800T Push Buttons come in many handy forms, such as with momentary or maintained contact push buttons, 2 and 3 position selector switches, jogging buttons, etc. All push buttons have double break, silver contacts, and terminals are equipped with shakeproof wire clamps. Name plates can be provided for special, as well as standard, designations.

Independent pilot lights or stations with pilot lights can be furnished in various colors. Send for Bulletin 800T.

Allen-Bradley Co.
1316 S. Second Street
Milwaukee 4, Wis.



Key-operated Push Button

Pilot Lights in various colors

5-53-R

A-B Quality

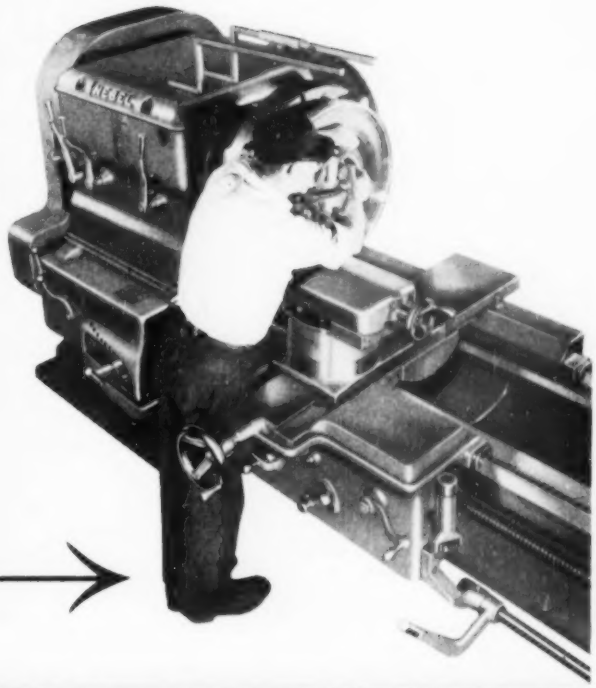
ALLEN-BRADLEY

QUALITY

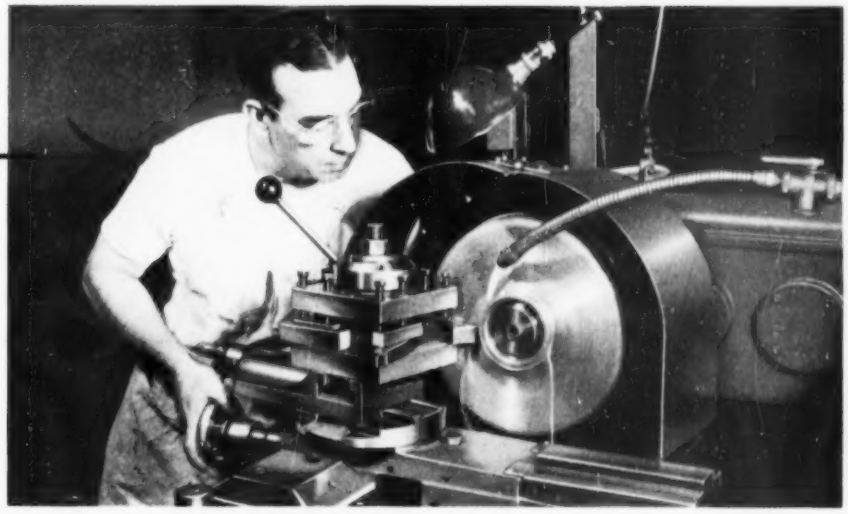
BULLETIN 800T PUSH BUTTONS

Nebel's a natural!

FOR MAINTENANCE



FOR PRODUCTION



KAISER-FRAZER CORP. *uses 8 Nebel LN lathes for fast, accurate, economical machining in production lots.*

NEBEL ENGINE LATHES are demons for economy. On production or maintenance, you get power, stamina and accuracy at minimum cost.

NEBEL GAP LATHES, removable block gap and extension bed gap, offer larger swing and center distance capacity . . . combine low price with high quality. Get full information today! The Nebel Machine Tool Co., Cincinnati 25, Ohio. Members of the National Machine Tool Builders' Association.

Nebel

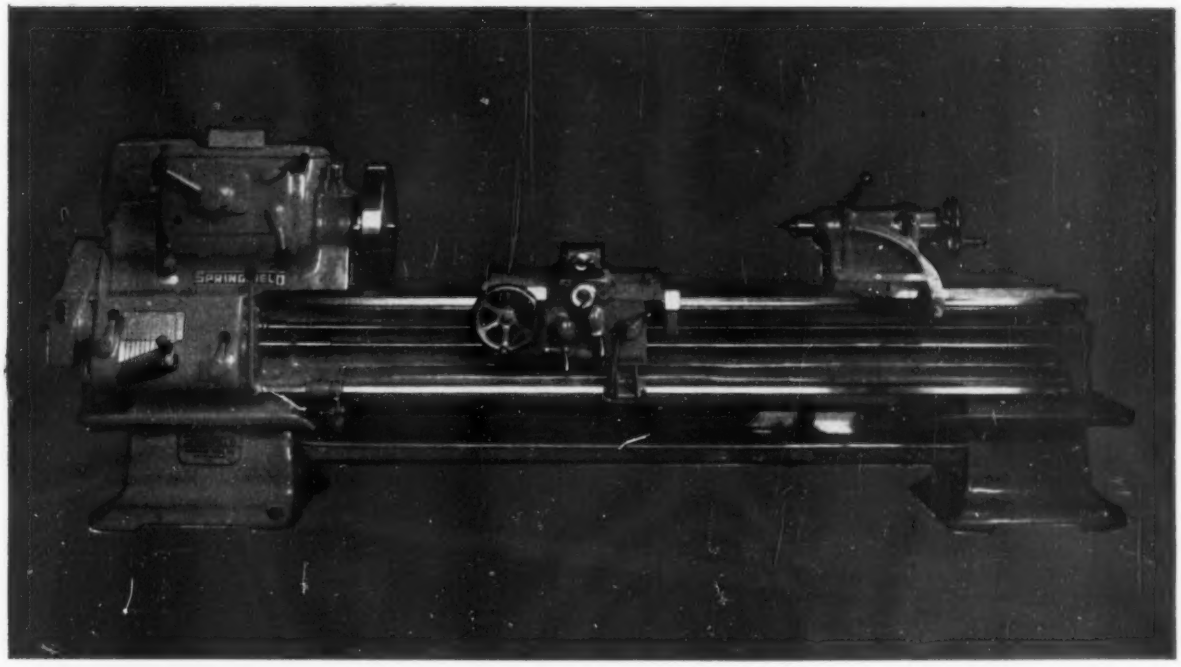
the workhorse of the metalworking shop since 1899

SPRINGFIELD

At TRACTOMOTIVE Corporation

Tractomotive Corporation, Deerfield, Illinois, manufacturers of the widely known line of TRACTOSHOVELS and TRACTOLOADERS use several Springfield Lathes on heavy operations. Tractomotive's management says: "Production records, low maintenance costs and operator preference have shown us that Springfield Lathes fit our manufacturing picture perfectly."

LATHES



What are YOUR Lathe Production Problems?

TURNING—BORING—CONTOURING—PROFILING?

Springfield has a long record of successful pioneering in the adaptation of Springfield Lathes to production of all types of work. Extreme versatility is a characteristic of Springfield Lathes and Accessories. Your production can be improved by installing a Springfield Lathe equipped with proper attachments.

Information is available to you through an experienced Springfield Distributor in your area. We will gladly arrange for a sales engineer to survey your production problems.

Write, wire or phone:

THE SPRINGFIELD MACHINE TOOL COMPANY

SPRINGFIELD, OHIO, U. S. A.

GENERAL DISTRIBUTORS: BRYANT MACHINERY & ENGINEERING COMPANY, 400 WEST MADISON ST., CHICAGO 6

EXCLUSIVE REPRESENTATIVES IN ALL PRINCIPAL CITIES

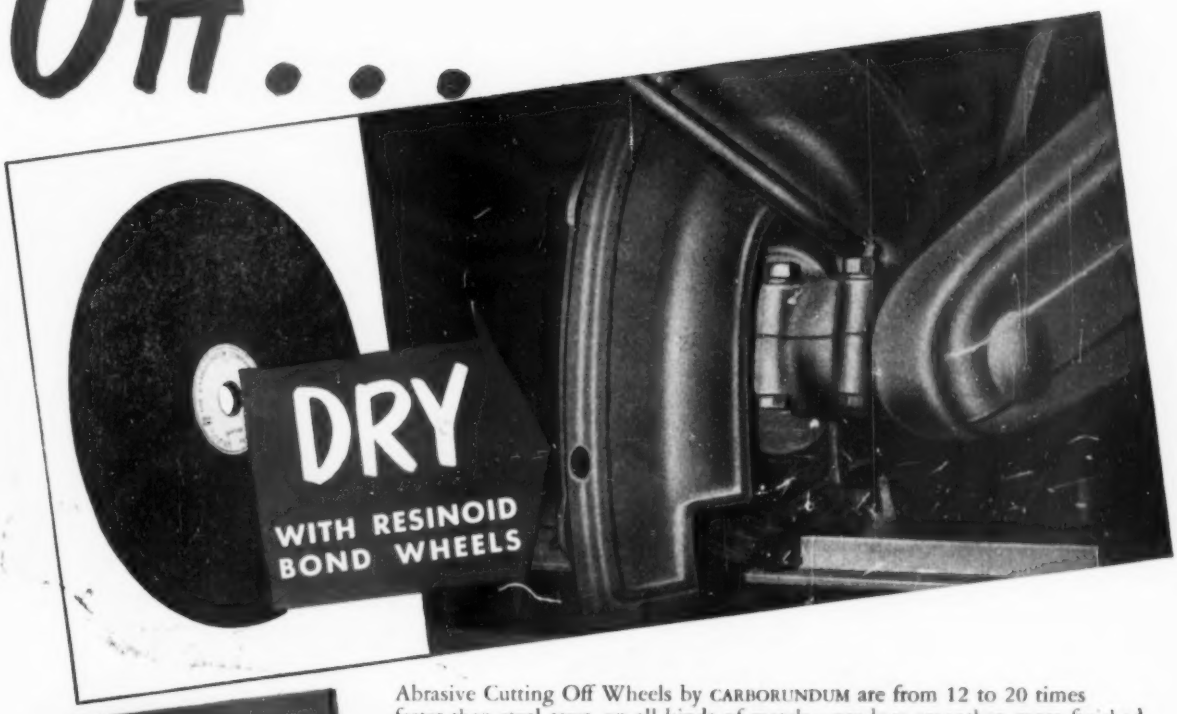
Metallic Cutting

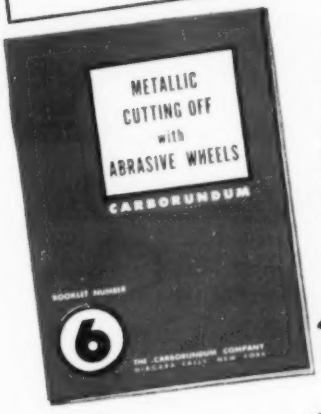
Only CARBO

TRADE

"Carborundum", "Aloxite" and "MX" are registered trademarks which indicate manufacture by The Carborundum Company, Niagara Falls, N. Y.

Off...





Abrasive Cutting Off Wheels by CARBORUNDUM are from 12 to 20 times faster than steel saws, on all kinds of metals—produce smoother, more finished, better quality cuts than you can get with flame cutting or shearing—and they do the job at lower overall cost than conventional methods. Rubber bond wheels as thin as five thousandths—resinoid bond wheels as thin as 1/32"—"MX" wheels as thin as 3/32"—there is a wheel by CARBORUNDUM for every high speed production operation in your shop.

ORDER FROM YOUR CARBORUNDUM DISTRIBUTOR TODAY. He's your best bet for complete stocks, prompt delivery, experienced counsel on latest developments in the field. You'll find him listed in the yellow pages under "Abrasives." Phone him today—it's to your profit!

This "tell-all" booklet is FREE!

THE CARBORUNDUM COMPANY, Dept. AM 81-82
Niagara Falls, New York

Please send me, FREE, your booklet No. 6,
"Metallic Cutting Off with Abrasive Wheels."

NAME AND TITLE

COMPANY

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RUNDUM

MARK

offers ALL abrasive products...to give you the proper ONE

81-82

Life-Line motor

PAIRED FOR PRODUCTION

Life-Line starter

ASSURE

production schedules with these two

Climbing production curves necessitate squeezing out every possible productive minute from every production machine. There's no time for motor and control "time out". Together or individually, Life-Line motors and starters offer the best assurance of continuous production. They are built to—

STOP outages due to improper bearing lubrication. Life-Line motors, with their prelubricated, sealed-for-life bearings, need no lubrication. Grease guns can be thrown away—motor lubrication schedules forgotten.

STOP outages due to cracked and broken motor frames. Life-Line motor frames stand up to the hard knocks of day-to-day use. They're steel. More protection is afforded with less size and weight. This rigid frame maintains bearing alignment and positive rotor air gap.

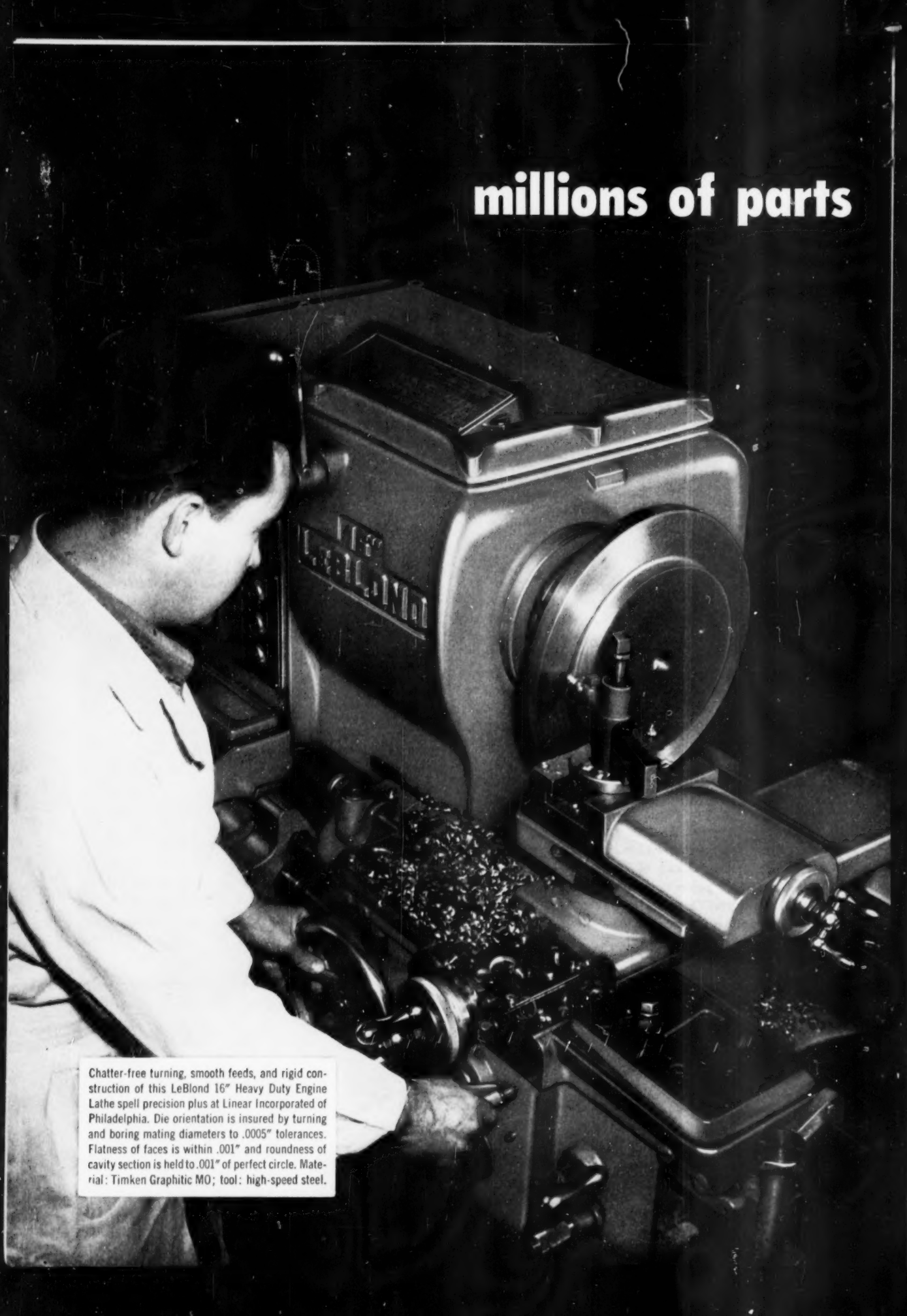
STOP outages due to burned and pitted starter contacts. Life-Linestarter's® exclusive "De-ion®" arc quencher quickly extinguishes destructive arcs. The "De-ion" grid snuffs out arcs . . . contacts last longer.

STOP outages due to inadequate overload protection. Life-Linestarter prevents motor burnout due to overloads. The bimetallic, snap-action, disc type of overload relay shoulders the burden. Precise calibration . . . not affected by aging or oxidation.

Other Life-Line features that will aid you in meeting increased production schedules are covered in "Life-Line Book", B-3842 and "Tomorrow's Starter Today", B-4677. Ask your Westinghouse representative for your copies. Or write to Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-21642-A

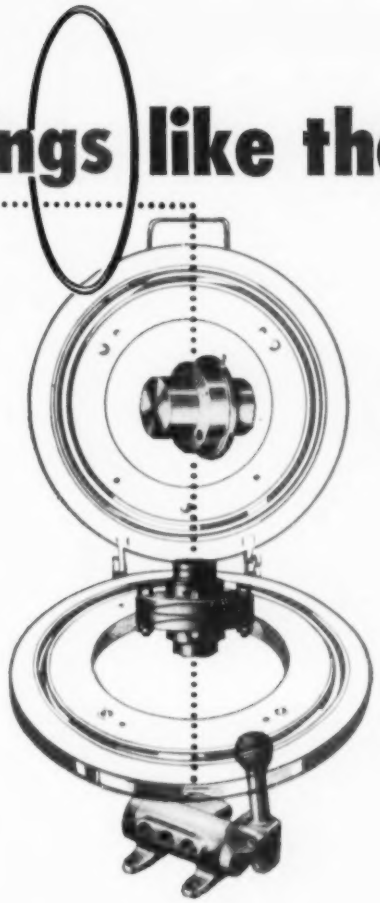
YOU CAN BE SURE...IF IT'S Westinghouse

millions of parts



Chatter-free turning, smooth feeds, and rigid construction of this LeBlond 16" Heavy Duty Engine Lathe spell precision plus at Linear Incorporated of Philadelphia. Die orientation is insured by turning and boring mating diameters to .0005" tolerances. Flatness of faces is within .001" and roundness of cavity section is held to .001" of perfect circle. Material: Timken Graphitic MO; tool: high-speed steel.

are married with rings like these



Industry needs sealing rings to "marry" millions of parts against leakage of air, liquid, and gas. Seals, for example, like the rubber "O" rings made by Linear Incorporated of Philadelphia. They're vital to the successful operation of hydraulic mechanisms, air-operated devices, and chemical processing equipment . . . to name just a few applications. And industry says, "Make these sealing rings to precision tolerance for non-leakage. Deliver the millions we need at low cost."

Linear experimented . . . found that "O" rings with the required finish and roundness could be mass-produced easily enough . . . but to turn them out at low cost demanded virtual elimination of hand-finishing operations. The problem called for dies made to tolerances that would deliver cross-sectional roundness conforming to nearly "perfect circle," mating diameters so accurate that perfect die orientation could be achieved.

Then Linear installed their new 16″ LeBlond Heavy Duty Engine Lathe. This profit-building lathe is saving expensive toolroom time and delivering cavity finish on Linear's dies as fine as 10 microinches, mating diameters to the required .0005″ whisker of tolerance, cross sectional roundness within .001″ of perfect circle. Costly die-finishing time at Linear is down . . . flash-removing second operations on "O" rings are at a bone-bare profit-making minimum. It's a case of chatter-free turning, smooth-as-silk feeds, and rigid construction.

LeBlond features like hardened and ground self-compensating steel bed ways, totally enclosed quick-change box, one-piece apron and a host of others will insure Linear a lifetime of this same smooth-turning performance.

Whether you need unfaltering accuracy or high output rapid production, there's a LeBlond lathe that will fill the bill. Your nearby LeBlond distributor will tell you about our complete line. Call him or write

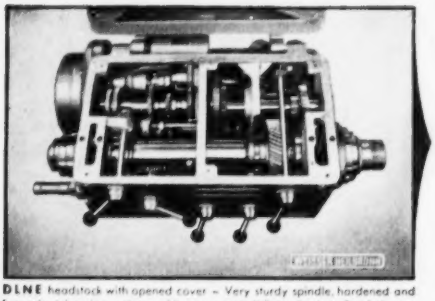
THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for Bulletin HD125A
for more information on the 16″
LeBlond Heavy Duty Engine Lathe

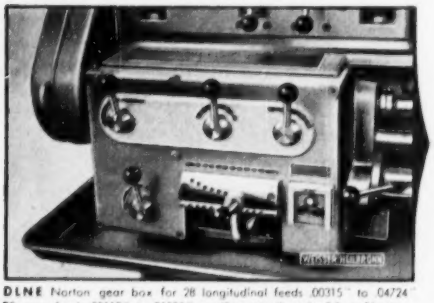
turned faster by

LEBLOND *of Cincinnati*

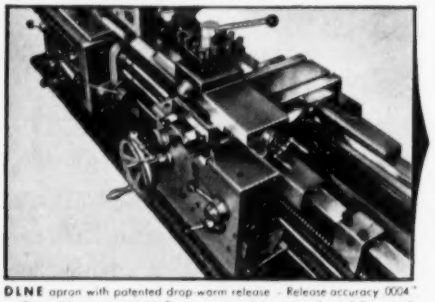
WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 64 YEARS*



DLNE headstock with opened cover – Very sturdy spindle, hardened and lapped at bearing points – All gears and sliding wheel shafts of chrome nickel alloy steel, hardened and precision ground.

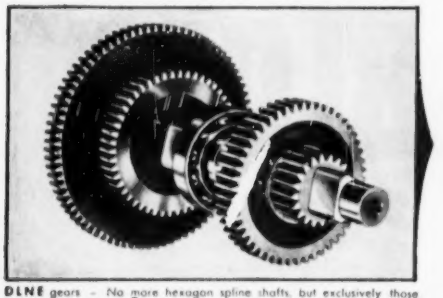


DLNE Norton gear box for 28 longitudinal feeds .00315" to .04724" 28 cross feeds .00118" to .01890" – 42 metric threads, 0.5 to 56 mm – 43 Whitworth threads, 2 to 28 threads per inch – 26 modulus threads 0.25 to 14.0 – 66 diametral pitch threads 1 to 112. Gears need only be shifted for modulus and diametral pitch thread cutting.



DLNE apron with patented drop-worm release – Release accuracy .0004" – Cross slide provided with T-grooves permitting mounting of form tools and cutting-off tools.

DLNE tailstock – Honed tailstock bore (superfinish) – Very sturdy sleeve of 3" Ø – The sleeve shows an inch graduation to facilitate boring work.



DLNE gears – No more hexagon spline shafts, but exclusively those with patented triangle Δ profile. This makes displacing of wheels impossible while machine is running, prevents gear breaks and extends lifetime of lathe.

Increase your Production

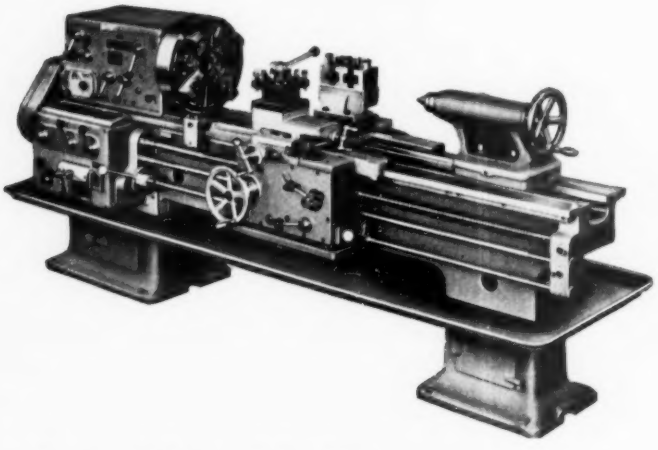
by use of the

HIGH EFFICIENCY HIGH SPEED LATHE

MODEL DLNE

7 advantages bound to increase your output:

1. Bed with diagonal ribbing, rigid structure, good chip flow.
2. Full protection against accidents thanks to safety devices; Face plate, chuck and dog plate equipped with slip safety device.
3. Largely dimensioned slide bearings of approved special bronze – Dimensions of front bearing 4" Ø × 6¼", of rear bearing 3⅛" Ø × 5⅛".
4. Hardened and precision ground gear wheels guarantee quiet running and excellent surface of turned work.
5. Norton gear box for 177 standard metric, Whitworth, modulus, and diametral pitch threads; coarse and multiple thread cutting attachments.
6. Patented apron with automatic release of longitudinal and transverse feed effected through micrometer stop guarantees a release accuracy of .0004". No recoiling of carriage when feed is released, therefore no tool breaks.
7. Carriage spindle adjustable backlash free by means of spindle nut.



Representatives and Service:

USA: Guthery Machine Tool Corp., 130 West 42nd Street, New York 36, N. Y. Telephone CHickering 4-2820.

Canada: Transocean Machine Company Inc., 267 Dunbar Avenue, Montreal 16, P.Q. Telephone REgent 3-5373

WEISSER HEILBRONN

EUGEN WEISSER & CO. KG.

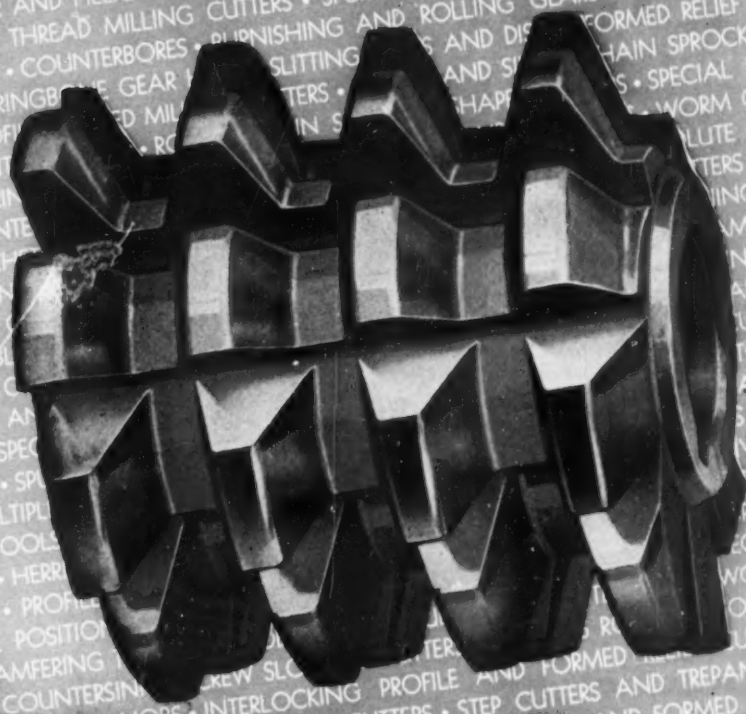
HEILBRONN/NECKAR (Germany)

Werkzeugmaschinenfabrik – Salzstrasse 79/83 a. 128/130

FOR THOSE TOUGH *Special* JOBS

...DEPEND ON

National Tool Co.



Years of successful experience in *special* tooling and related production problems are yours for the asking. When the job requires *special* cutting tools call in your National Tool Co. representative. He is backed by more than 46 years experience in the engineering and manufacture of *special* cutting tools. His assistance is yours, without obligation, whether you're interested in one tool or a complete tooling program.

Since 1905 engineers and manufacturers of high-quality special cutting tools for the metal-working industry

National Tools Cleveland

National
TOOL CO.
Cleveland 2, Ohio

IF IT'S P-K® IT'S OK

OK for Hardness and Toughness

OK for Tensile Strength

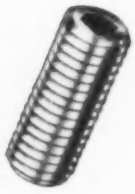
OK for Shear Strength

OK for Thread Contour and Lead

Good judgment calls for **PARKER-KALON** *when good design calls for* **SOCKET SCREWS**

SIZE-MARKED CAP

FLAT HEAD BUTTON HEAD



GROUND THREAD SET

ORDER from the local P-K DISTRIBUTOR... the SUPPLY SPECIALIST that serves you

This unique head design saves assembly time

Only P-K offers the Size-Mark and Gear Grip on Socket Head Cap Screws.

The size is clearly incised on the head, can be seen at a glance. It saves time and wasted screws when sizes get mixed up, prevents errors by "green" workers, helps veterans, also, to speed assembly. Maintenance men like it — it aids them in reassembling. Gear Grip prevents slips, speeds work, even when fingers are oily.

Since assembly expense is a sizable percentage of total production costs (in some products as high as 75%), fastening operations are any manufacturer's primary target for cost reduction.

Start making savings you've missed. Ask for samples. Parker-Kalon Corporation, 200 Varick St., New York 14.

PARKER-KALON®

SOCKET SCREWS

SHOULDER

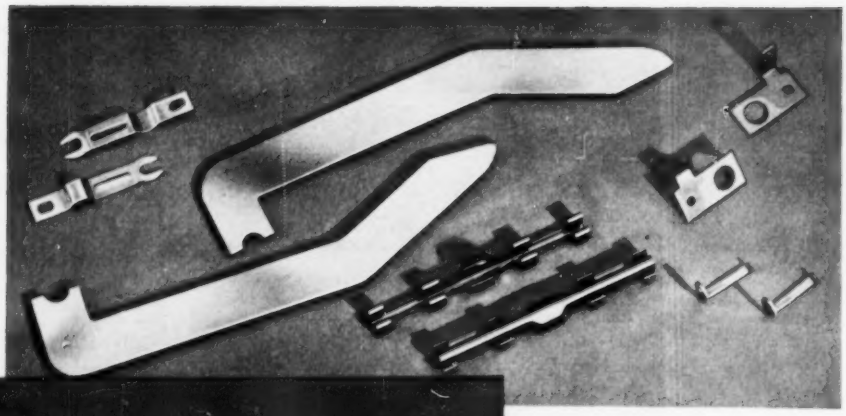
HEX KEYS

PIPE PLUG

OK for Trouble-free Assemblies

SOCKET SCREW DIMENSION FINDER

Helps you plan assemblies. Pocket-size plastic chart gives essential dimensions of all types of P-K Socket Screws. Includes Set Screw Point Dimensions, and Thread Length Formula. Available FREE from your P-K Distributor.



Parts for PROCTOR Irons and Toasters Produced RAPIDLY and ACCURATELY Using U. S. Automatic Press Room Equipment

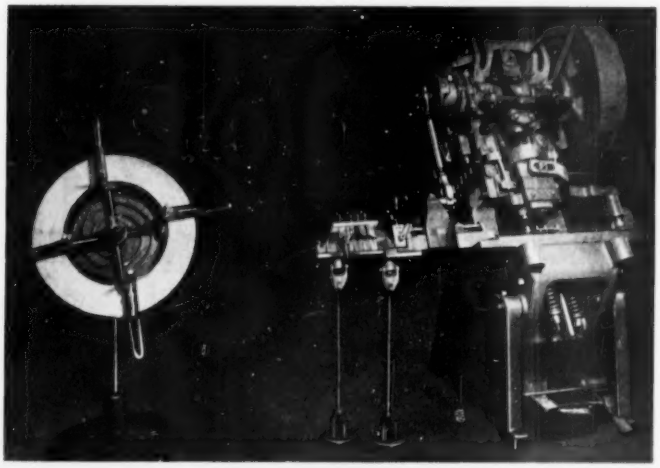
The production program at Proctor Electric Company, Philadelphia, Pennsylvania, famous manufacturers of appliances, calls for the fabrication of many different types of metal stampings for use in Proctor Irons and Toasters.

The precision inherent in end products of this type naturally results from the accuracy with which the component parts are produced. To insure the desired result, conventional punch presses at Proctor Electric Company are equipped with U. S. Slide Feeds and Straighteners. U. S. Slide Feeds are generally recognized for their extreme accuracy, dependability and versatility. The U. S. Slide Feed can pull material (within its capacity) through a plain stock straightener and still maintain controlled accuracy of feed length. Also, U. S. Slide Feeds can operate at speed as high as can be provided by conventional punch presses.

If your operations include the production of metal stampings, ask for a copy of Bulletin 80-A on U. S. Automatic Press Room Equipment.

The parts illustrated above cre just a few of the different types of metal stampings being produced at Proctor Electric Company on conventional punch presses crranged with U. S. Slide Feeds, Stock Straighteners and Stock Reels.

The photograph below shows a typical setup of conventional punch press equipped with U. S. Slide Feed, Straightener and Stock Reel for holding the coils of material.



PRODUCTS

U. S. TOOL COMPANY, Inc.

AMPERE (East Orange) NEW JERSEY

One set-up saves 30%

Photos courtesy of the Kelman Electric & Mfg. Company, Los Angeles, California.

Boring, facing, and high speed drilling with one set-up cut the floor to floor time about one-third on this job.

The Kelman Electric & Mfg. Company say their Cincinnati Super Service Radial Drill "handles easily, is very accurate and versatile."

They are facing 6" diameters; drilling for ½" bottom tap, and tapping with a ½" bottom tap on this job.

The part being processed is a Bronze Top Casting.

Cincinnati Super Service Radial Drills are profit makers in this shop, and they could be in yours.

Write for Bulletin R-21C

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

HARDINGE ELMIRA, N.Y. Collets for Lathes and Milling Machines

for **ACCURACY**
DURABILITY
ATTRACTIVE PRICE
STOCK DELIVERY

Specify **HARDINGE** *Collets*

A useful reference list for Purchasing and Engineering departments. Helpful ordering information and up-to-date listing of popular style collets for all makes of lathes and millers. Shows major dimensions; maximum capacity for round, square and hexagon; collet adaptations for nose type chucks; stocking locations; how to order and prices.

WRITE NOW!

If you do not have a copy of Bulletin No. 50

HARDINGE BROTHERS, INC., ELMIRA, N. Y.

PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE

SCENE 114:
"3 Taps in 1"
... an actual scene from the GTD-Greenfield sound film "FACTS ABOUT TAPS AND TAPPING"
VOICE: "Sometimes a very special tap is the only solution to a difficult threading problem . . . Here we see a special tap designed by GTD-Greenfield engineers to enable a pump manufacturer to tap three concentric holes in one operation . . . Special taps may far offset higher initial cost in greater production on the job."
GREENFIELD
TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS
This 26-minute full-color motion picture "FACTS ABOUT TAPS AND TAPPING" is now available for group showing through your local GTD-Greenfield distributor.

THAT'S JUST THE POINT!

. . . . Yes, but a mighty important part of any Twist Drill. That's where the first contact comes, that's where hole size, roundness and surface smoothness are made or lost. That, in short, is the heart of the drilling operation.

GTD-AMPCO Drills are made with special attention to point accuracy, but behind the point you'll find that GTD-AMPCO Drills are exceptional for concentricity of flutes and lands, regularity of margins, polished flutes for better chip slippage, *and* in sizes over 1 inch the exclusive GTD-Ampco feature . . . they're HAMMER-FORGED for extra toughness and longer wear life.

AMPCO TWIST DRILL DIVISION

GREENFIELD TAP AND DIE CORPORATION

GREENFIELD, MASS.

Keep in step with this man

... he's one of the most influential men in America. He's a salesman.

Some think of him as "*just* a salesman", it's true. But to the astute, he's more than that—much more.

He is a veritable mine of information, ready and waiting to be tapped.

He makes it a rule to keep himself well-informed on many things that have vital bearing on *your* business: —new methods in material handling or recent developments in machine tools, for instance.

He may very well have red-hot news on abrasive wheels, steels or alloys for cutting tools—data that might have been released by the manufacturer only yesterday.

He can probably tell you whether or not your lathes, milling machines, drills, planers, shapers, boring mills, broaching machines, gear cutters and grinding machines are running with the optimum combination of feeds and speeds.

He has a good idea of how your machine tool equipment stacks up against the best, and can judge pretty well if your costs are as low as they could be.

In short, he's loaded with information and sparking with ideas that might help you produce better.

He deserves—and will appreciate—your friendly attention. Perhaps he's coming in your door right now . . .

Send for your free copies of "Work Done on the Blanchard", fourth edition, and "Art of Blanchard Surface Grinding".

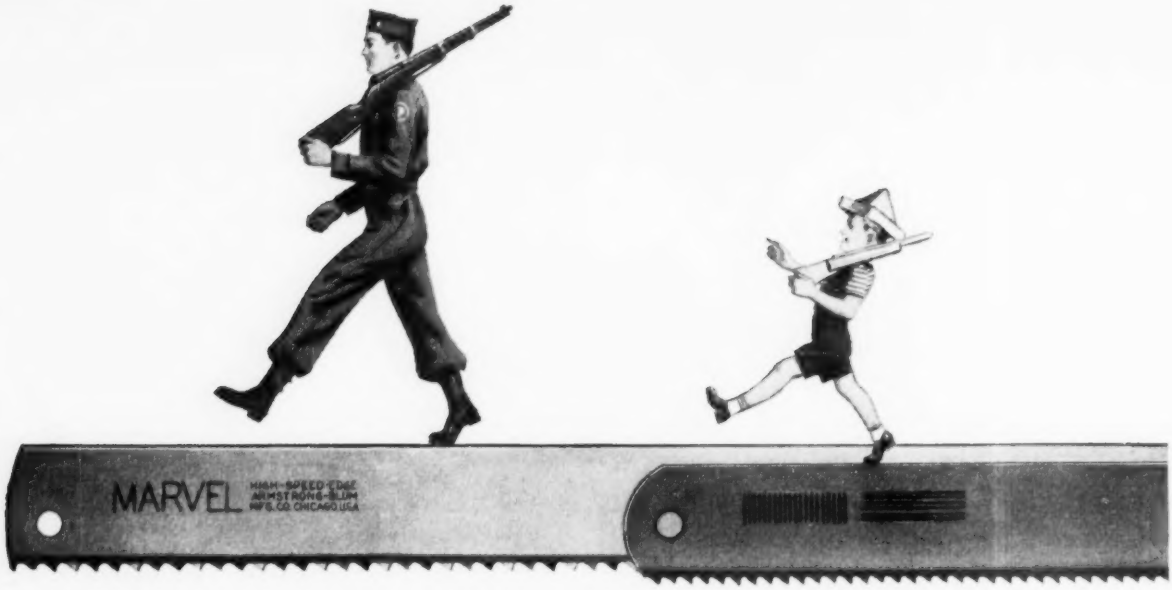
BLANCHARD SURFACE GRINDERS · BLANCHARD GRINDING WHEELS

PUT IT ON THE

THE BLANCHARD MACHINE COMPANY
64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

BLANCHARD

Distributors in principal cities



. . . *but*
Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When-as-and-if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate — without the "know-how" of MARVEL EXPERIENCE . . .

Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be SAFE, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!

MARVEL *Metal Cutting* SAWS

Better Machines-Better Blades

ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.

THE WINNER!...for lowering costs

Pick pink CIMCOOL° and you'll be way out front —all the way, and in *every* way. Because this radically new and different cutting fluid does a *better job* and *saves you money* in three important ways:

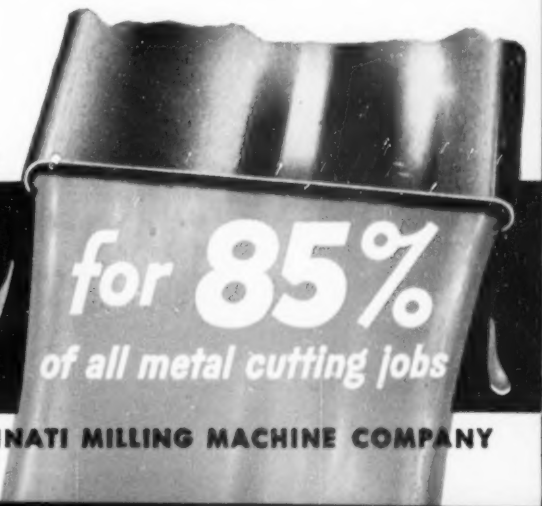
CIMCOOL INCREASES TOOL LIFE (and thus reduces down time) because of its chemical lubricity.

FASTER SPEEDS are possible because Cimcool cools faster, through a unique physical change in the cutting fluid itself. Tools and chips actually stay cool to the touch.

CIMCOOL COSTS LESS than old-fashioned cutting fluids because it lasts longer. It also cuts labor costs for cleaning and changing. It virtually eliminates rancidity and foul odors. And because of its low surface tension and low adhesion to work and chips, there is practically no carry off.

Let us show you how Cimcool can put your plant in the winning circle. Write us for a demonstration in one of your own machines. We'll have one of our Cincinnati Milling-trained machinists call on you—without cost or obligation. Or, if you prefer, write for our free booklet, "Cimcool Defeats Heat." Address, Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

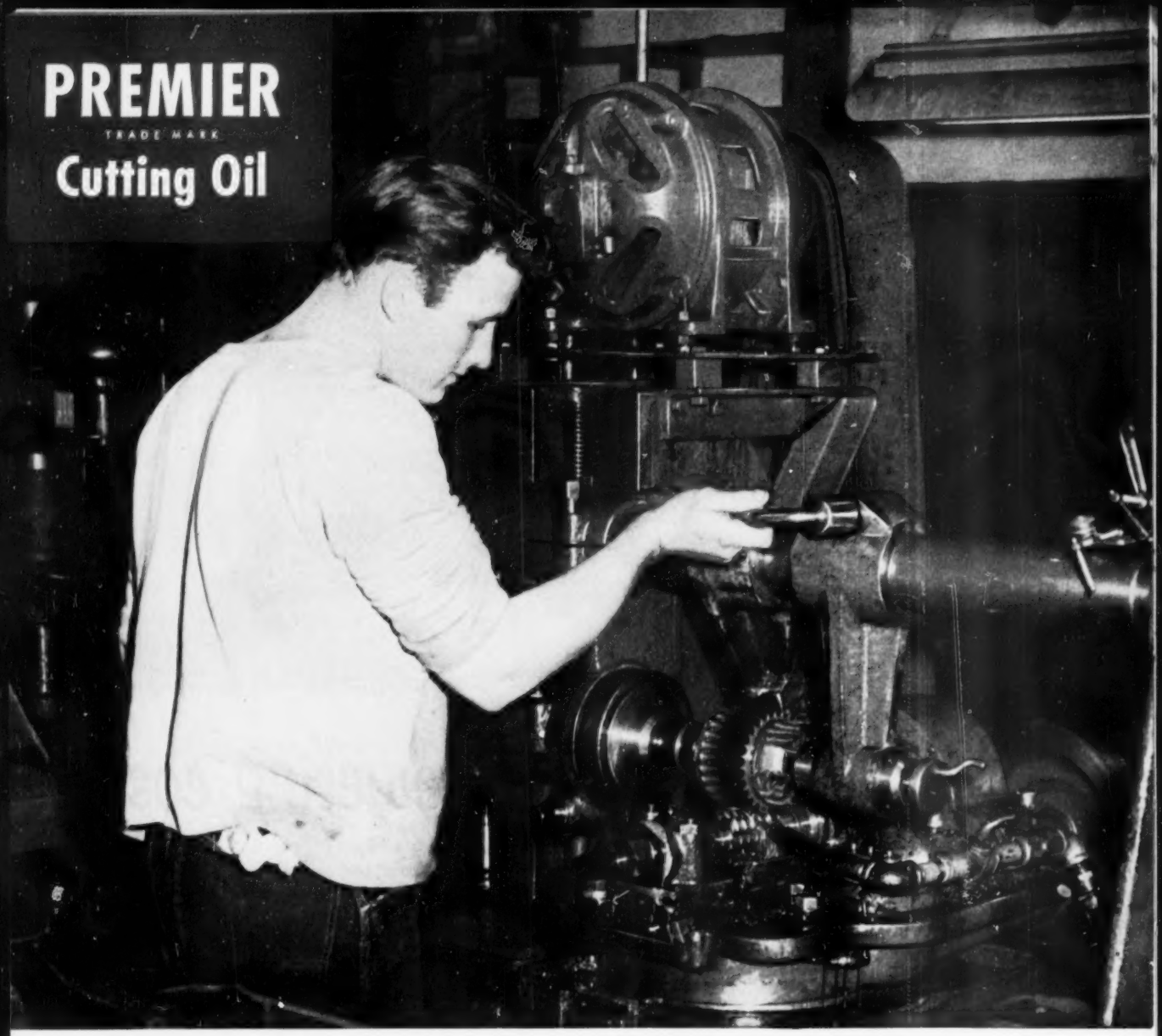
°Trade Mark Reg. U.S. Pat. Off.



CIMCOOL

for 85% of all metal cutting jobs

A PRODUCTION PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE COMPANY



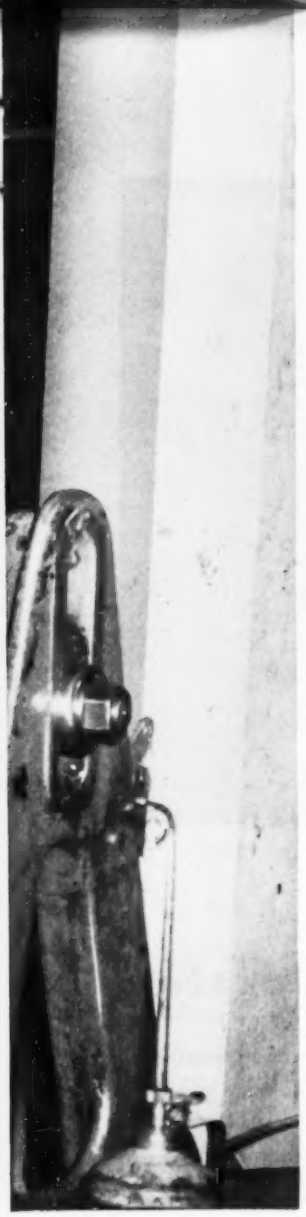
Hob life increased 75%

• The Gear Products Company, St. Louis, Missouri, tried various cutting oils for the hobbing of door latch spur gears from a free machining steel. With the best of the oils, an average of only 600 pieces could be produced before hobs required sharpening.

A Standard Oil lubrication specialist recommended PREMIER Cutting Oil, a light-colored, sulfurized cutting fluid. With the use of PREMIER, an average of 1050 pieces have been produced before hobs have required sharpening—a 75% increase of hob life. Less downtime for tool changes has resulted in higher production. Fewer sharpenings have significantly reduced tool costs.

The Gear Products Company, specializing in precision gears, gear trains, now uses PREMIER Cutting Oil for the majority of its gear cutting jobs. This has simplified both stocking and application of cutting oil.

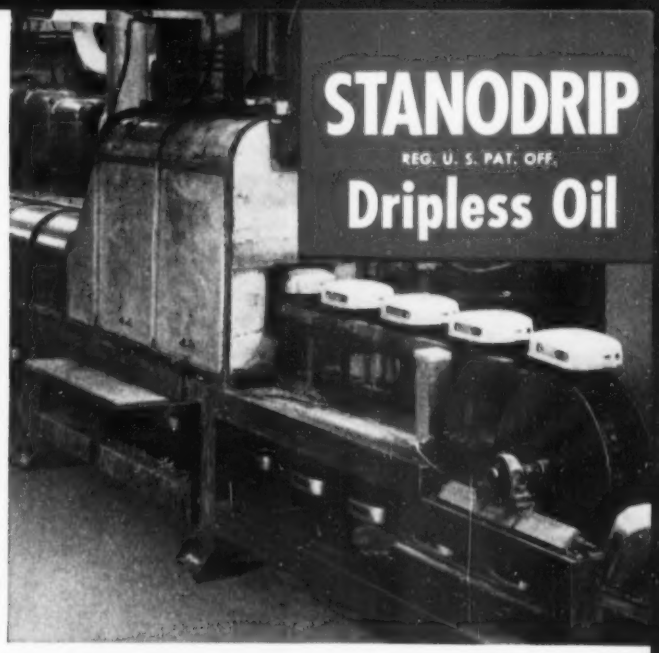
Whether you have a specified problem or are looking for better results, there's a good possibility that a Standard Oil lubrication specialist can help you. His experience and special training are backed by one of the finest and most complete lines of cutting oils and lubricants on the market. You can contact him easily by phoning your local Standard Oil (Indiana) office. Or write: Standard Oil Company, 910 S. Michigan Avenue, Chicago 80, Ill.



What's YOUR problem?

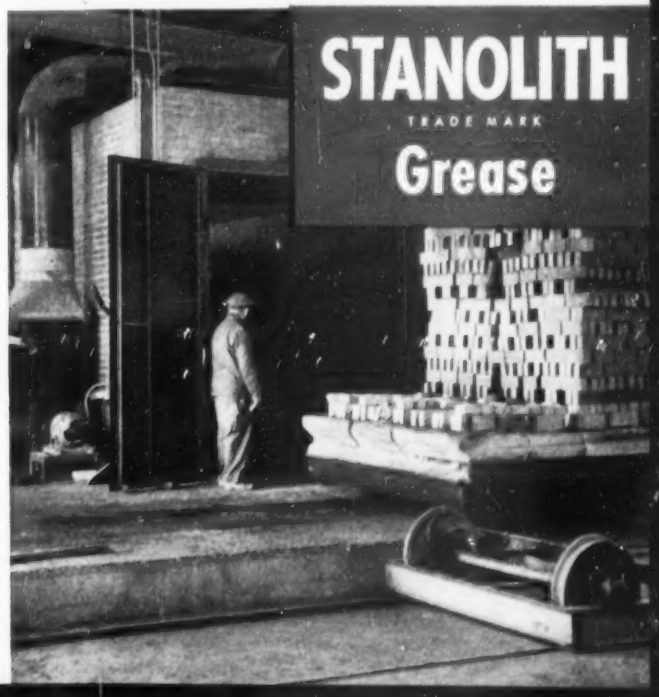
Fred. H. Moulton, lubrication specialist in Standard Oil's St. Louis office, worked closely with the Gear Products Company to help them get significantly greater tool life on the hobbing job described at the left.

To help you get better results with cutting oils and lubricants, Standard Oil has a corps of lubrication specialists located throughout the Midwest. One of these men is near your plant. He will give you the assistance you need when you need it. His wide experience and special training in the use of modern lubricants and cutting fluids will help you make real savings. You can reach him quickly and easily by phoning your local Standard Oil Company office. His services are backed by a supply set-up that is unique in the oil industry and that can mean convenience and savings for you.



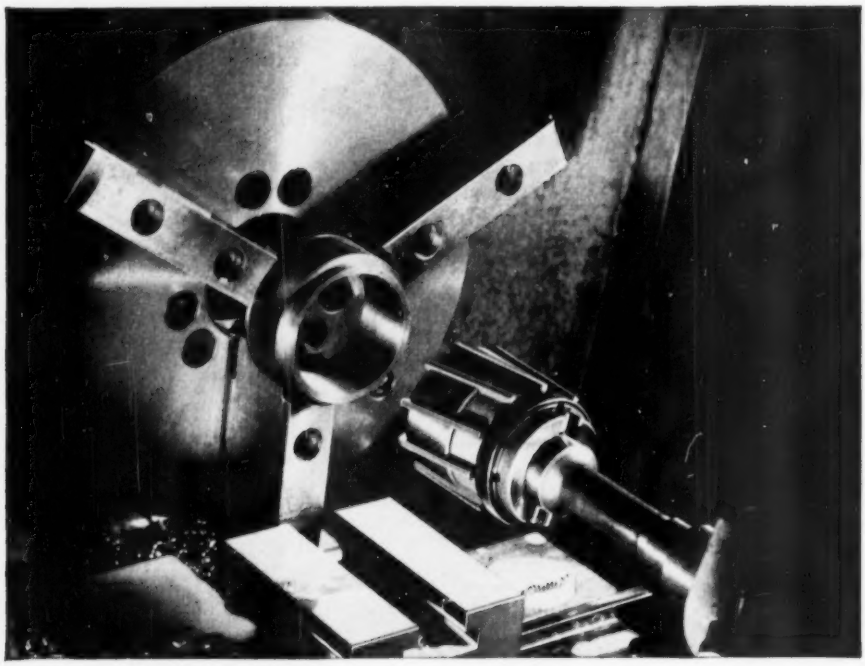
Polishes off lubrication troubles! The automatic buffing machine, shown above, represents the engineering ingenuity of the McGraw Electric Company's Toastmaster Products Division, Elgin, Illinois, who designed the machine. Represented, too, in the successful operation of this equipment, is the work of a Standard Oil lubrication specialist. When various lubricants failed to give satisfactory lubrication of conveyor bearings, the Standard lubrication specialist came up with the answer: STANODRIP Dripless Oil. STANODRIP has stopped corrosion and gumming troubles and has reduced bearing wear to a minimum.

Stops high temperature troubles, cold! A midwest company was sweating out a problem of lubricating kiln car wheel bearings. Kiln oven temperatures approached 2000° F. and bearing temperatures were around 400° F. Greases tried on the job broke down to form carbon and gummy deposits. Recommended by a Standard Oil lubrication specialist, STANOLITH Grease has stopped troubles, cold! Carbon and gum troubles have been eliminated. Continuous use of kiln cars has permitted greater production.



STANDARD

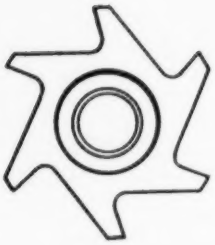
STANDARD OIL COMPANY
(INDIANA)



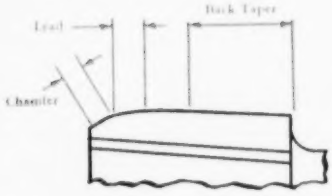
REAMER DESIGN Controls

Accuracy, Finish and Production

Barber-Colman Reamers produce finishes which were not previously considered possible on a standard production operation. Exceptional accuracy and tool life are also obtained on production runs as a result of the special features of Barber-Colman Reamers. Both solid-fluted and inserted-blade reamers are available.



Irregular flute spacing provides a smooth cutting action and fine finish, and helps to prevent the reamer from forming "welts". As a standard feature on all Barber-Colman Reamers, flutes or blades are spaced diametrically opposite each other so that they are easily checked with a micrometer.



The profile form on Barber-Colman Reamers is designed to produce the best possible finish and tool life. Following the chamfer, the lead is blended into a radius to produce exceptionally fine finishes. Through Barber-Colman cam-controlled sharpening, a sharp cutting edge, rather than a cylindrical land, is produced, resulting in a free cutting action. With this control, successive reamers are sharpened with exactly the same profile form and relief angles to provide exact duplication of size, straightness and roundness.

DESIGNERS OF STANDARD AND SPECIAL

20-25 micro-inch finish typical

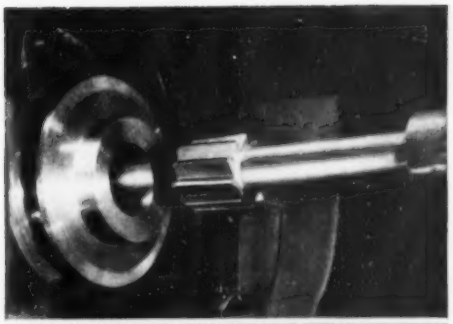
On this job, 1000 pieces are reamed to a surface finish of 20-25 micro-inches before it is necessary to re-sharpen the reamer. The feed is 1.75" per minute at 280 rpm., requiring 30 seconds to ream the 7/8" length of cut. Material is AISI C1137 steel.

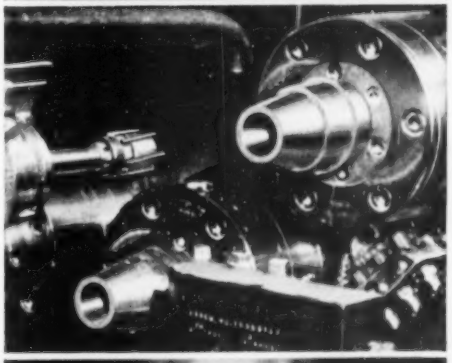
1500 pieces per sharpening

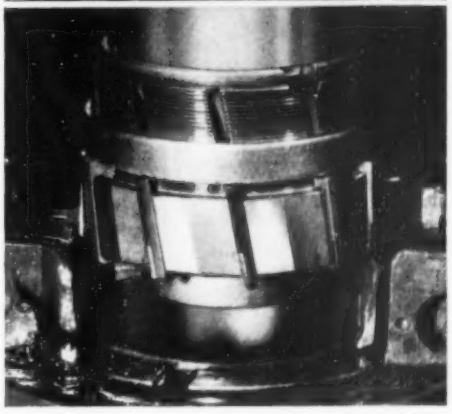
This carbide-tipped inserted-blade reamer produces from 1100 to 1500 pieces per sharpening while maintaining the finish better than 60 rms. Tolerance on hole size is .002". Stock removal is .012" to .015" on the diameter, and the material is B1117 steel. Speed is 105 sfm, and the feed is .0088" per revolution. A Barber-Colman Reamer Sharpener reproduces the correct profile on the reamer blades with each sharpening.

tool cost reduced from $1.57 to $1.32

These Barber-Colman Reamers are producing truck cylinder liners with accurate straight round holes free from welts or taper at a tool cost 15% less than previous records. Material is cast iron. Replaceable blades with carbide tips give long reamer life and cutting edges which stand up under continuous production. 675 more pieces per set of blades are now obtained, and tool cost per 100 liners has been reduced from $1.57 to $1.32.







If you are now choosing between accurate, quality-finish reamed holes — and low-cost production and tool maintenance — you can have both, using Barber-Colman Reamers. More flutes per cutting diameter, solidly backed cutting edges, and standard irregular flute spacing will give you tool room reaming quality under regular production conditions.

Send specifications on hole sizing and finishing problems to Barber-Colman engineers. They will furnish reamers for your particular requirements to give you the desired quality consistently.

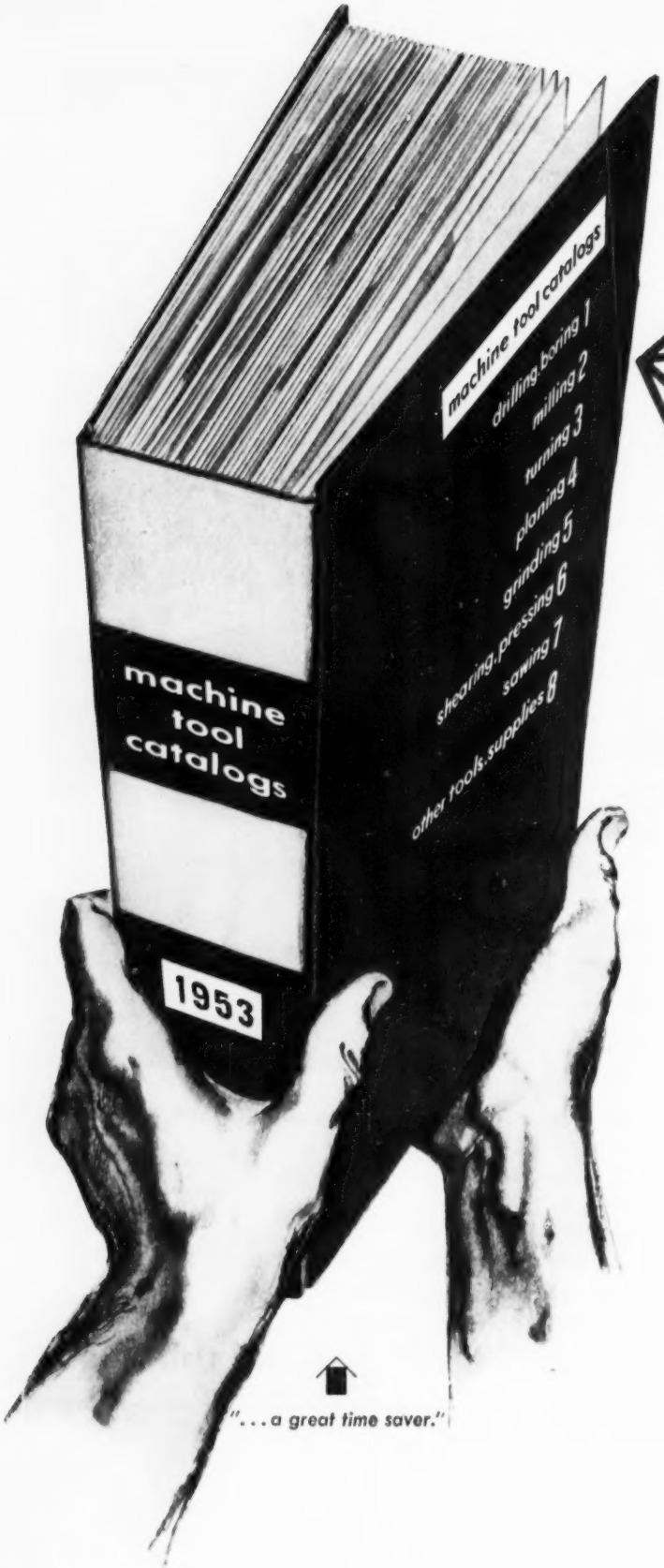
HOBS • CUTTERS • REAMERS
HOBBING MACHINES
HOB SHARPENING MACHINES

BARBER COLMAN

Barber-Colman Company

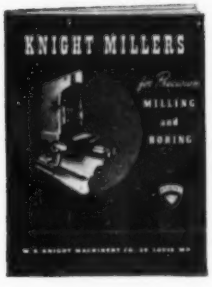
GENERAL OFFICES AND PLANT, 915 ROCK STREET, ROCKFORD, ILLINOIS

METAL CUTTING TOOLS SINCE 1908



looking for milling machines?

"...a great time saver."



also:

The following catalogs, in other sections of your Machine Tool Catalogs, contain information on milling machinery:

	SECTION
Baldwin-Lima-Hamilton Corp.	1
Bullard Co.	3
Cincinnati Gilbert Machine Tool Co.	1
Consolidated Machine Tool Corp. (Sub. Farrel-Birmingham Co., Inc.)	1
Davis & Thompson Co.	1
Fosdick Machine Tool Co.	1
Giddings & Lewis Machine Tool Co.	1
Lucas Machine Division— New Britain Machine Co.	1
Moore Special Tool Co., Inc.	1
Morey Machinery Co., Inc.	3
National Automatic Tool Co., Inc.	1
Sheffield Corp.	5
Sheldon Machine Co., Inc.	3
Snyder Tool & Engineering Co.	1
Wales-Strippit Corp.	6

reach for Machine Tool Catalogs

These manufacturers' catalogs are instantly available in Section 2 of your Machine Tool Catalogs. They contain comprehensive information on milling machines and accessories.

The other sections of the File contain additional catalogs covering a wide range of machine tools and accessories.

This collection of 81 manufacturers' catalogs is grouped in sections by types of equipment, so that you can more readily compare one machine tool with another. Indexes of manufacturers, products and trade names lead you quickly to the catalogs you are looking for.

Sweet's is working constantly to get more manufacturers to send you their catalogs in this easy-to-use form. If you fail to find what you want, please tell us.

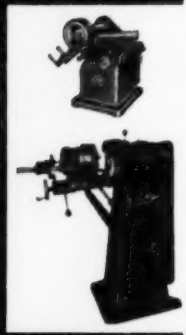
Sweet's Catalog Service

DIVISION OF F. W. DODGE CORPORATION

119 WEST 40th STREET, NEW YORK 18, NEW YORK

Keep Your on the OLIVER Line — Cost Cutting Production Boosting MACHINE TOOLS

OLIVER DRILL POINTERS



Properly machine ground drills give better performance. OLIVER Drill Pointers, with each lip doing equal work, give balanced cuts—more accuracy—more perfect holes—more efficiency—longer drill life.

As Illustrated:

No. 21 Oliver Bench Drill Grinder. Hand operated for Drills No. 57 to ½"

No. 510. For Drills ¼ to 3". 2-3-4 flute.

OLIVER DIE MAKING MACHINES

Efficient, speedy and accurate — effecting great savings in time and costs. Skilled labor is not required for sawing, filing and lapping operations.

Available in 5 Models.

Bench Model 5-1 (Illustrated) — Single Speed Die Maker for use on Tool Steel up to 1" Thick.

Heavy Duty Model (Illustrated) — 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

OLIVER ACE UNIVERSAL TOOL & CUTTER GRINDERS

Keep your most difficult cutters sharp with Oliver ACES. They excel on high speed and Tungsten-Carbide work. Direct reading for clearances reduces fatigue — eases operators' jobs.

The ACE excels for grinding face mills up to 15" also; slab mills • slitting saws • all types cutters and reamers.

2 Models: Heavy Duty (Illustrated) and Standard.

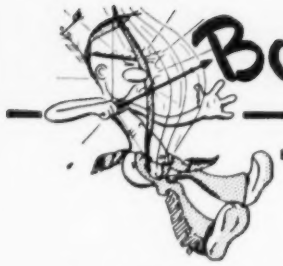
OLIVER 20" TEMPLATE TOOL BIT GRINDER

Efficiently powered by a 3 h.p. motor, this OLIVER Machine grinds on the periphery of a 20" wheel. Capacity: tools up to 1½" wide x 1¾" high from 0 to 20° clearance. The OLIVER is developed for production sharpening of single point Tungsten Carbide and high speed tools—offers increased production, lower tool costs and savings in man-hours. Extremely fine finish assured.

Write Today For Complete Information

OLIVER INSTRUMENT CO.

1414 E. MAUMEE · ADRIAN, MICHIGAN



Backlash

EXTRACTS FROM CURRENT LETTERS TO THE EDITORS

Toolmaker's Reply

The letter by A T Renson (*AM*—March 30 '53, p74) is quite interesting and much of what he says is correct. Very few of even the finest toolrooms have perfect equipment, especially if it has been in use for a number of years. But what the heck! He's a toolmaker, isn't he? And toolmakers should be able to produce perfect work on poor equipment, that's where their skill—and their high pay—comes in. If toolroom machines were so good that no great amount of skill were needed to make holes true and square, the work could just as well be done by production workers and there would be no need for toolmakers.

Suppose it does take him a couple of hours to get the exact spacing of two holes for a jig. The cost of that time is nothing compared to what the jig saves in production time. And the accuracy of the jig permits the shops to use relatively inaccurate machines which cost much less than the super-precision equipment that would be needed if there were no jig.

I think the trouble is that he overlooks the effects of normal wear. Every time that big angle plate is clamped to the jig-borer table, a certain amount of wear takes place. Every time it receives the thrust of the spindle, there is some deformation. These are not measurable each time, but in the long run they add up, for there is no such thing as a wearproof material. Then, too, there is the matter of temperature. A change of only a few degrees will make a difference in the accuracy of the work.

As an oldtime toolmaker I appreciate his troubles; I've been through it all myself, and things were a lot tougher when I was a young man. We didn't have half the equipment they have today, and we had to rely on our own skill and ingenuity. Sure, it would be wonderful if we could just push a button and the machine would make itself square and level but, as I said before, if they could do that they wouldn't need toolmakers.

Henry Yorke
Chicago

No License Needed

We noted with concern the very interesting and informative article by J M Anspach entitled, "Non-Destruc-

GRINETICS

BY D G SMITH

TIE ROD

CROSS SECTION

HEAT TREATMENT

Republication rights reserved

An open letter to potential buyers of special machine tools and special tooling

Now, we can offer you greatly expanded facilities for the solution of your specific metalworking problems

FOR 55 years we've been designing and building special machine tools — as well as tooling and adaptations for standard equipment. But because of limited facilities, we could serve only a minimum number of you as customers in this ever expanding and increasingly important market.

Frankly speaking, we have decided that the time has come when we must be able to serve more of you. To do this job right, we are now completing a $5,000,000 plant expansion to handle this work — to help you solve your special production problems with special machinery and special tooling, big — or small.

Here are our qualifications:

EXPERIENCE: We've been in the business 55 years. During that time we have designed and built over 60,000 standard and special machine tools. *In recent years, our production of special machinery has ranged up to four million dollars annually.*

FACILITIES: Our new expansion is devoted exclusively to the production of special machinery. The new plant, built on a site covering 38 acres, is equipped with *over $2,500,000 worth of the very latest tools and equipment* — many of them custom-built for the job.

PERSONNEL: Our Special Machinery Division engineering section has at its command nearly *100 experienced, imaginative and practical design and project engineers* . . . men fully qualified in the sciences of applied mechanics, hydraulics, electronics and metallurgy . . . and metalworking.

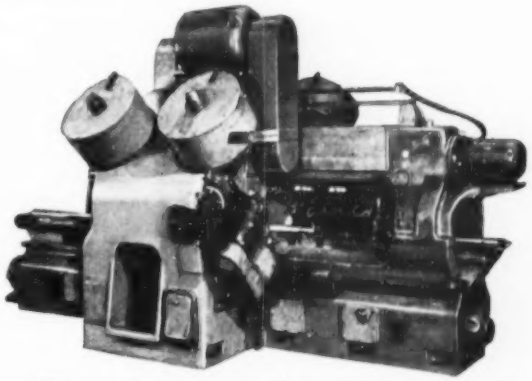
PERFORMANCE: Kearney & Trecker's Special Machinery Division is best recommended by its outstanding record of successfully solving many hundreds of unusual machining problems . . . problems that involved demands for high volume production, as well as exacting dimensional accuracy and fine surface finish.

RESPONSIBILITY: Our Special Machinery Division is an integral part of the Kearney & Trecker Corporation . . . and is fully supported by all its financial and physical resources. Any commitment for a product of this division is a commitment that fully involves the accepted reputation for responsibility and satisfaction that is Kearney & Trecker's.

We invite your inquiry

We'll be glad to provide you with any information we can . . . including sample machine specification sheets on typical installations, a brochure covering the expanded facilities of our Special Machinery Division, and details on our Customer Engineering Service. Furthermore, if you have special production machinery problems, have one of our senior Project Engineers analyze them, without obligation, of course.

Write, wire or phone the Special Machinery Division, Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.



We've built special machines or adaptations of standard equipment for practically every industry. Here is a photo of a transfer-type milling machine we designed and built for a major automotive manufacturer.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

taps won't break...

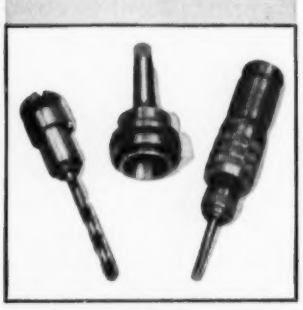
...Wickman Combination Tapping Attachment

- Applies Safe Torques ALWAYS
- Saves Taps, Labor, Materials

Here's an effective remedy for tapping headaches—a positive, safe tapping attachment with an entirely new clutch principle. This tapper guarantees your taps against breakage because it replaces coiled springs with a resilient material 100 times more effective than steel.

The Wickman Combination Tapper safeguards taps even in blind hole tapping; high resiliency of the pressure unit permits the clutch to slip the instant the tap strikes bottom or a hard spot. And, it's simple, too! Definite torque settings for given taps and tap sizes, without regard to materials being tapped, can be changed instantly without tools.

Wickman Tappers can be used on all reversible machines for horizontal or vertical tapping, blind or through holes. Three sizes are available: T-1, ½"-1¾" USS; T-2, ⅜"-1¼" USS; T-3, 3/16"-½" USF.



NOW—IMPROVED DESIGN GIVES NEW VERSATILITY, FASTER CHANGE-OVER

New features on improved model include a new detachable tapper shank holder with quick change lock for tapper or drill adapter. Change-over from tapping to drilling, counterboring, reaming etc. is made in a few seconds. No tools necessary. Send for free bulletin for full details.

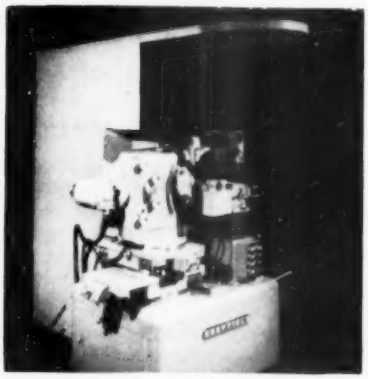
THE Wickman MANUFACTURING CO.

10325 CAPITAL AVENUE OAK PARK, DETROIT 37, MICHIGAN

tive Testing Reveals Casting Defects" (*AM*—Mar 2 '53, p 117). Please refer to the last paragraph, which reads: "Magnetic-particle method equipment must be purchased from the Magnaflux Corp, Chicago. A license must also be obtained. The company's Zyglo process is also licensed."

The Sonoflux Corp manufactures magnetic-particle inspection instruments also, so it is not necessary to purchase same from the Magnaflux Corp in Chicago. Moreover, no license is required to purchase and use our equipment.

L O Seerden
General Manager
Sonoflux Corp, Houston, Texas



Confirmation

One of our customer , the Schmarje Tool & Engineering Co, wrote you recently concerning an article on the Russian optical profile grinder (*AM*—Mar 2 '53, p106).

As he has called it to your attention, I thought I should drop you a line and a photograph of a machine we built in 1944 and originally called our Projector Form Grinder. This model has since been superseded by our Visual Form Grinder. I thought you would be interested in the comparison between our original machine and the later Russian development.

J T Welch
Mgr Machine Tool Sales
Sheffield Corp, Dayton

Question

Is there any proper name for the upper and lower halves of a die set, like cope and drag of a foundry flask? Some people refer to them as punch holder and die holder, but this is not really exact because sometimes the punch is held in the lower half and the die in the upper half. It is not a matter of great im-

portance, but it would be interesting to know if there are proper names for these parts.

Robert Lasalle
Cincinnati

We have never heard of any special names. Do any of our readers have ideas on the subject?—Ed.

Movie Star

One of the leading British aircraft engine manufacturers ordered a number of lathes from Axelson Mfg Co, Los Angeles. Engineers made the long trip to the West Coast of the U S to discuss and decide on modifications and special tooling to be supplied with the machines, and it was arranged that test pieces would be supplied to insure proper functioning of the machines before shipment from the plant.

As these machines were to be regarded as the cornerstones of a defense production plant, it was important to obtain proof that they were capable of carrying out the job for which they were intended, and also a basis for accepting delivery without necessitating a further journey to Los Angeles. There was no time to send test pieces back and forth, and the weight of these would have made the cost of air freight prohibitive.

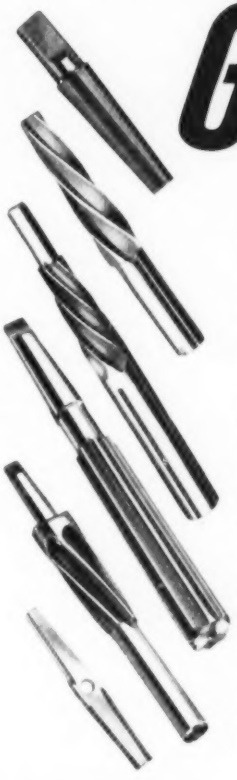
We therefore suggested that a motion picture be made of the entire work cycle of the machines. While the machines were under test, 400 ft of 16-mm film were taken and immediately flown to London. The customer's engineers were thus able to ascertain that actual performance satisfied their extraordinarily exacting requirements. After that, a cable sufficed to have the machines sent on their 8000-mile journey via the Panama Canal.

We believe this is the first time that tooling of machine tools has been proved by filming. In this case, the success has been so convincing that we shall use the method again when the occasion arises.

J H Raynor
Stuart Davis, Ltd
Coventry, England

FOR SPECIAL REAMERS . . . REMEMBER

GORHAM



They may not *look* alike, but all of the special tools on this page share a common function . . . *because every one is a reamer!* Each was engineered and manufactured by Gorham Tool Company to provide a practical solution to a specific production machining problem for one of our customers.

Actually, these reamers represent just a few of the many special-purpose cutting tools produced by Gorham. Others include milling cutters and end mills, inserted blade cutters, flat and circular form tools, profile cutters, and carbide tipped tools of every description. Gorham "specials" are turning problems into profits in thousands of plants every day . . . and the one we engineer for you will solve *your* next production machining problem, too! Take advantage of our experience.

Your nearby Gorham Field Engineer is a qualified cutting tool expert in both practical design and actual application, and his assistance is yours without obligation. Just write for his name, or send details of your problem direct to us. We'll have him get in touch with you promptly.

Gorham TOOL COMPANY

"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

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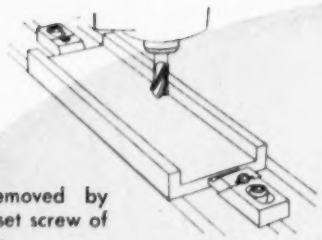
WEST COAST WAREHOUSE: 576 North Prairie Ave., Hawthorne, Calif.

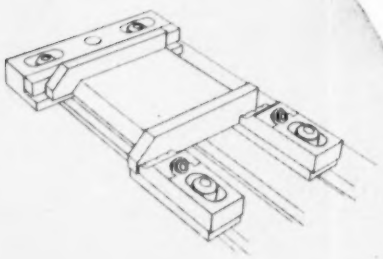
Eliminate U-Clamps, Straps and Fingers

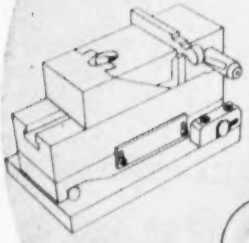
J & S *All-Purpose* JAW CLAMPS

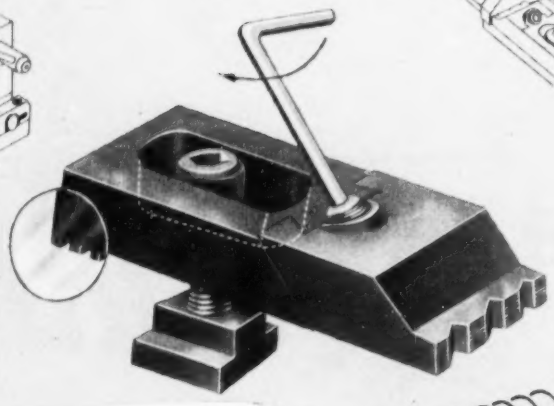
secure work-pieces quickly and rigidly
easily adapted to box fixtures



Work-piece removed by loosening one set screw of one clamp only.

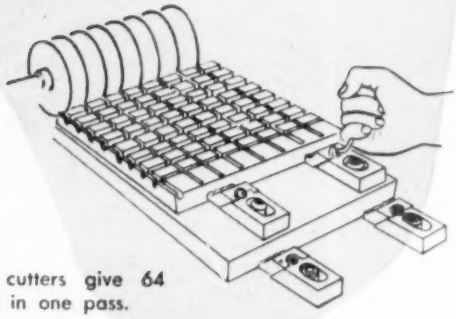






J & S Double Half Vise, for use on jig borers, millers, planers and shapers.

Precision Grinding Vise with or without sine bar allows rapid unloading and exact relocating.



Eight cutters give 64 pieces in one pass.

NEW METHOD OF SECURING WORK-PIECES TO MACHINE TOOLS

for Lathes, Planers, Milling Machines, Boring Millers, Jig Borers, etc. (9 different types including new Counter Clamp)

1. **Faster Set-up:** *One adjusting screw* provides a 5-ton force to *position* and *hold* the work-piece.
2. **Stronger Grip:** The *inward* and *downward* movement of the jaw clamp at a 45° angle gives a *single, powerful clamping action* — easily applied and controlled.
3. **Less Obstruction:** You can pass over the whole clamp 1" from the working surface of the machine face. *No interference with reading or measuring tools.*

WRITE FOR NEW FOLDER ON TYPES AND SIZES!

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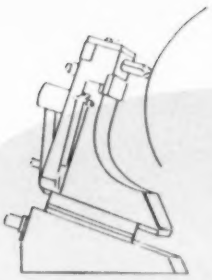
High-Carbon, High-Chrome Construction

.0001" ACCURACY

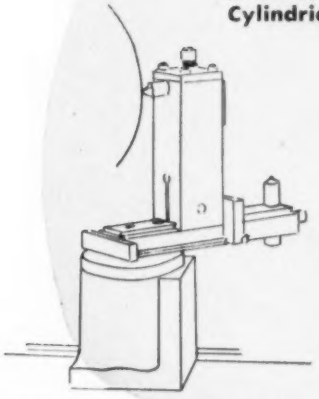
Fluidmotion

WHEEL DRESSERS

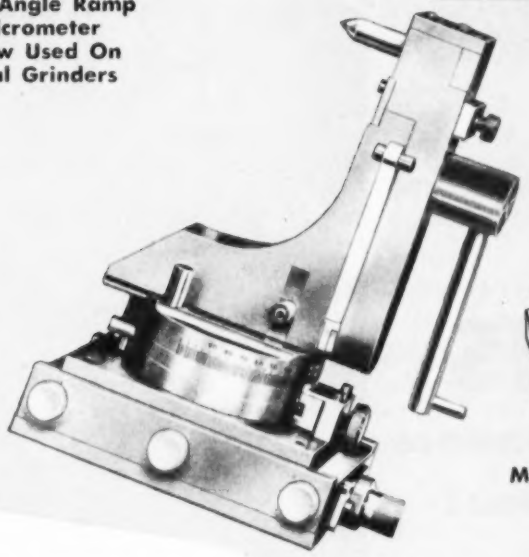
dress two angles tangent to a radius in one continuous motion

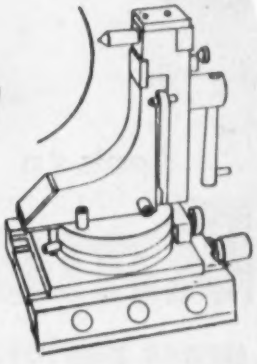


New Solid Angle Ramp With Micrometer Lead Screw Used On Cylindrical Grinders



Form-master Low Cost Angle Or Radius Dresser

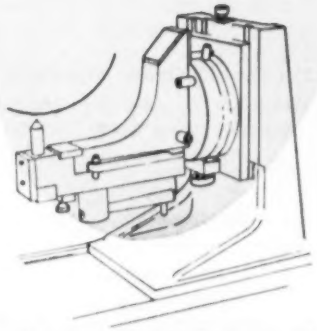




Model "REC" on Surface Grinders up to 14" Diameter Wheels

ADAPTABLE TO ALL TYPES OF CYLINDRICAL AND SURFACE GRINDERS

With the "Fluidmotion" Dresser, you can *dress* two angles *tangent* to a radius—using one handle *in one continuous motion*. Operation is so fast and simple that beginners can use them to boost your grinding machine out-put. Forms are always clean, precise—angles and radii "flow" into each other. Contours are consistently sharp, accurate to .0001", without tool or chatter marks.



Under the wheel fixture with micrometer feed for use on surface grinders

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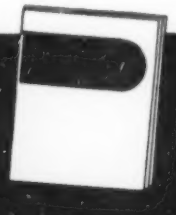
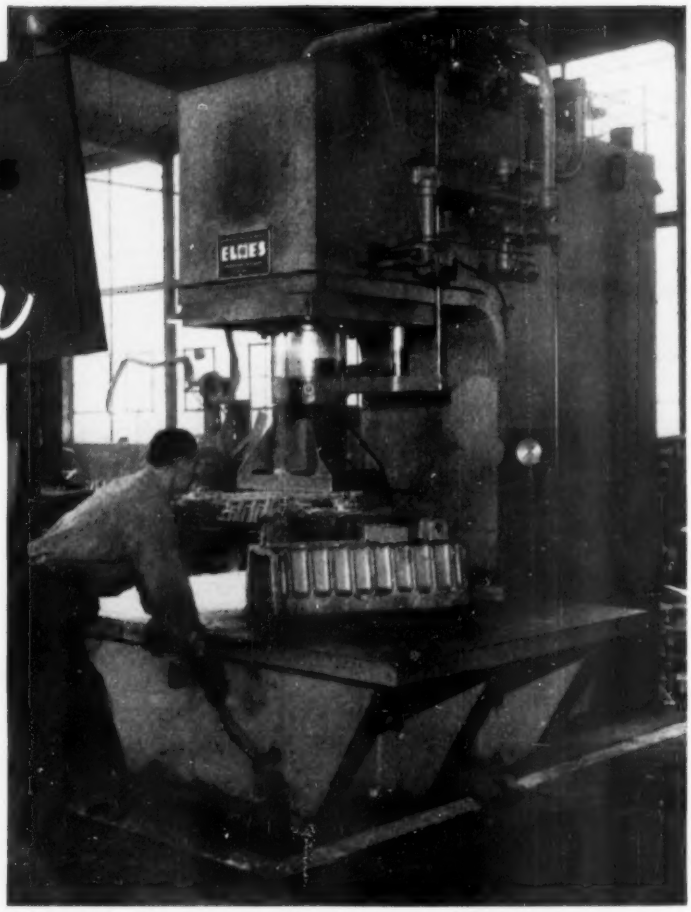
A variety of models and attachments to suit your needs. Write for free catalog covering dressers in detail. J & S also manufactures a complete line of All-Purpose Jaw (machine) Clamps, Vises, and Special Tools. Write for Machine Shop "Time Savers" booklet.



Straightens Steel Castings 40% Faster



Elmes Open-Side Press in plant of Maynard Electric Steel Casting Company, Milwaukee, producers of electric furnace steel castings.

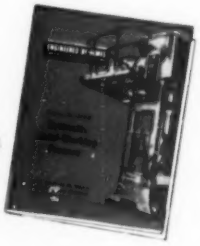
Look to Elmes for press performance at its best!

The Elmes 250-Ton Hydraulic Open-Side Press shown in photograph is used for straightening castings ranging from 50 to 4000 lbs. The Maynard Electric Steel Casting Company reports that this Elmes Press is 40% speedier than the presses previously used, and also is more accessible and more economical to operate.

This is but one of many types of hydraulic metal-working presses produced by Elmes—but the customer report is typical in its praise of Elmes' craftsmanship in press design and manufacture. For all kinds of standard or special-purpose metal-working press applications, you'll be time and money ahead if you rely on Elmes Presses to do the job. Elmes Presses—whatever the type—bring you important performance economies. Elmes *Pipeless* Hydraulic Presses, which reduce costly down-time, give you *even greater* savings. Why not look into the many advantages offered by Elmes Hydraulic Metal-Working Presses? Individual recommendations and cost estimates will be supplied promptly on request.

WRITE FOR ELMES BULLETIN 1010-B

Illustrates, describes, and gives major specifications on complete line of Elmes Hydraulic Metal-Working Presses.



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SPOT NEWS of Metalworking

- **Vance Plan for broadening the mobilization base** by creating more defense production capacity has full support of Eisenhower administration. It was endorsed recently by National Security Council, with Defense Secretary Wilson present and voting affirmatively, according to reliable sources. Mr Wilson's plans for narrowing the base apply mostly to the current defense production program, especially for fiscal 1954.

- **Method for rapid calculation of production equipment requirements** of airframe and landing gear manufacturers has been devised by Stanford Research Institute. Estimating system, using thousands of tabulating cards, is based on knowledge of the particular company, aircraft type, airframe weight, planned output rate and planned machine utilization (hours per month). Method was developed for Navy Bureau of Aeronautics in cooperation with eight airframe and five landing gear makers.

- **Cold tube reducing machine, using 7500-lb dies, handles 18-in. OD tube** to produce seamless tubing up to 16-in. OD with 0.200 wall thickness.

Practicality of dual-purpose plants is being questioned by executives of major auto companies. They reason it this way: If you want to make tanks or guns, you use high bays and cranes and large general-purpose equipment. Automobiles and appliances are made in low-bay shops (maximum height 18 ft below trusses) and special-purpose equipment is the rule. You either use the space for one purpose or the other and store the idle machines, or you keep what amounts to another plant in standby condition.

- **Pentagon is out to recapture control of the Central Inventory of Machine Tools** owned by the armed services but now centered in NPA's Metalworking Equipment Division. A merry battle is on, with no decision expected until after May 15. Pentagon thought it had the transfer "in the bag" until ODM and NPA put up a loud squawk.

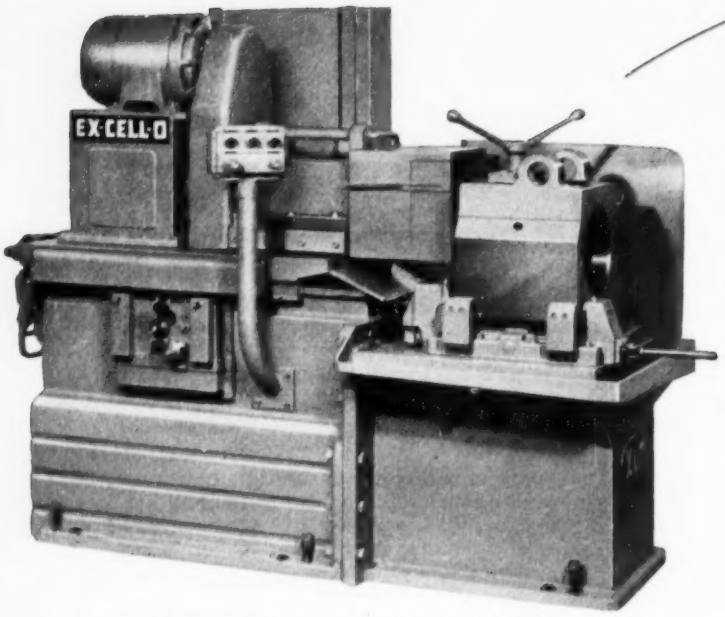
- **Program for enlarging capacity for production of "elephant" machine tools** is on dead center and may stay there indefinitely. Nothing will be done until armed services present a bill of particulars as to the volume and kind of elephants needed in an emergency. Meanwhile G.A. Gray Co and Onsrud Machine Works Inc are only firms given green light for expansion. Most of government's $10-million fund remains uncommitted.

- **"Punc" is the latest word being added to Washington's gobbledegoop.** It stands for "probable ultimate net cost" to government of any project or program.

Ratio of military to civilian orders in tool and die shops has done an about face in recent weeks. Formerly, the ratio was 80% military — 20% civilian. Today it is 40% military — 60% civilian. And in Detroit, Cincinnati, Providence and Milwaukee areas, military business is less than 25% of tool and diemaking volume, it was reported at NTDMA's Washington Planning Meeting (See p 204).

- **Metalworking Equipment Division as well as other industry divisions** in National Production Authority will become permanent working part of Department of Commerce, with men from industry serving as chiefs on a rotating non-salary basis similar to plan used since NPA was formed. Effective date for this change has not been announced.

- **An average of $1811 in incentive pay** was paid in 1952 to each of 34 foremen in an important Cleveland metalworking plant. Average foreman's pay for the year: $9073. Average income tax: $1617.56.



Ex-Cell-O One-Way Precision Boring Machine is equipped for operations on a heavy gun part. The machine table carries a precision boring spindle with its drive equipment, and the end section supports the fixture.

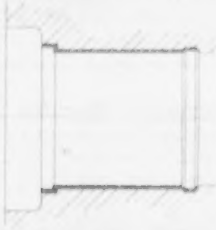
EX-CELL-O

WAY MACHINE

PRECISION BORES, COUNTERBORES . . . AND GROOVES A 600-lb. STEEL FORGING

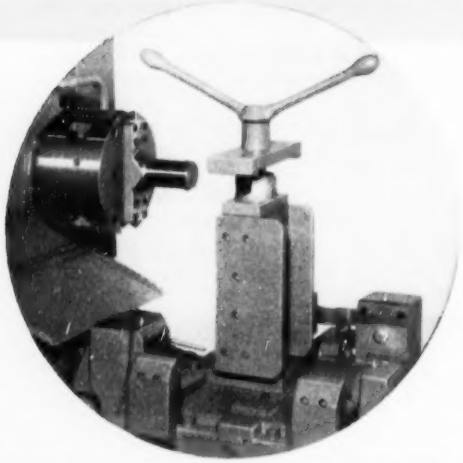
XLO
EX-CELL-O for PRECISION

On a large gun part, operations shown in the heavy lines are performed in an automatic cycle.



As the table feeds forward the boring and counterboring operations are performed, then the shoulder is plunge-faced at a reduced feed rate. When the table engages a positive stop the cross feed head plunges the grooving tool to the required depth, then the table feeds back to another positive stop which limits the width of the groove. The cross-feed head retracts and the table returns to the starting position.

Ask your local Ex-Cell-O representative about all the other advantages of Ex-Cell-O Way Machines, or write today for Bulletin 31631.



Close-up view of the cross-feed head on the spindle. It carries three tools for boring, counterboring, and grooving the heavy gun part in an automatic work cycle.

EX-CELL-O

CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

53-19

Washington

Consensus of Defense Secretary Wilson's well-publicized remarks on the mobilization base is that he was erroneously interpreted—and that he did not recommend a basic policy change.

Deputy Secretary Kyes has spelled out Wilson's idea like this: for economy's sake there should be a retraction of the broad base, but not a complete shift to awarding contracts to a chosen few producers. This policy would mean more arms for less money and would create a hard core of what could be a permanent munitions industry—the first such for the US.

ODM officials who hit the ceiling on hearing the first reports of Wilson's remarks have been appeased by this more moderate view of the Defense Secretary's mobilization plan. Key to the broad vs narrow base controversy is what happens to the $500 million appropriation request for reserve production capacity (the Vance Plan) in the Truman budget.

The fund remains in the new Pentagon budget so far. But if Wilson tries to knock it out—as he reportedly did before—or cut it substantially, the whole controversy will flare up once more.

• • •

Kyes has taken a severe swipe at the military brass. He says there are less than six men in the Pentagon who have experience and ability to handle production problems involving billions. So he and Wilson want a new staff of civilian production experts.

This criticism has been expected. Reason is that a group of "professionals" have been whispering to any who would listen that the new team of civilians would never get out of the woods. A lot of uniformed brass have been deliberately dragging their feet in hopes of discouraging the secretaries. Idea was to discredit the new team before it got started—too many areas long considered private reserves of the military were being invaded by the new civilians.

Example: Wilson and Air Secretary Talbott ordered a switch from emphasis on the strategic air to tactical air. Air generals have been fighting this for over two years. They were able to stall Lovett and Finletter. But Wilson's decision was final—build more fighters and less bombers with new money.

With a tight rein at the Defense Secretary level, the superbomber advocates can no longer run to Congress for appeal. That's why they've been fighting the new secretaries.

• • •

Top ODM officials are looking for industry people to take over the key units in the revitalized agency—production, materials and stockpiling, mobilization planning and preparedness, economic stabilization planning, manpower. The White House wants new blood to replace the old-line top-echelon personnel inherited from DPA and NSRB.

• • •

NPA Administrator McCoy had to sell Commerce Secretary Weeks on keeping NPA in the Commerce Department. Weeks is so squeamish about controls that he wanted to kick the agency out of his department. But Weeks was eventually impressed that NPA's new role will be as a fact-gatherer and priorities coordinator, not as an agency running a massive controls system. It will operate with about 500 people, less than one-tenth its peak size.

Since Weeks' recent clash with National Bureau of Standards Director Astin, personnel recruiting agents from private industry—including metalworking—have been swarming into Washington trying to hire disgruntled and allegedly demoralized government scientists.

The recruiters are as busy here as on college campuses before graduation. About 400 NBS technicians had threatened to resign if Astin's dismissal by Weeks was not revoked. Weeks backed off, is now keeping Astin on the job for at least two more months.

• • •

Defense spending is high — but not high enough. Present rate of check-writing for the Pentagon is about $4.3-billion a month, including funds for arms aid transferred to the military by the President. If this rate continues through June, military spending for all purposes in fiscal year 1953 will amount to $45.5 billion, about $5 billion more than last year.

Even so, this falls short of ex-President Truman's figures for the year. His estimate was that the Defense Department would spend about $44.4 billion in direct military expenditures plus another $4 billion in arms aid. It now looks like the Pentagon will fall short by $3 billion.

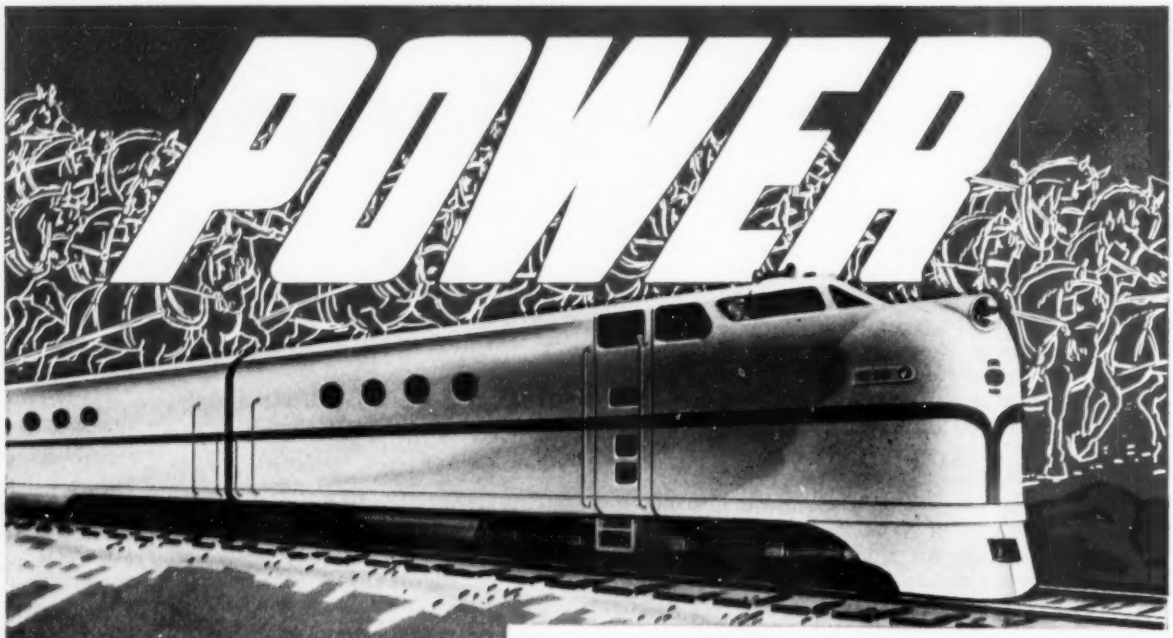
• • •

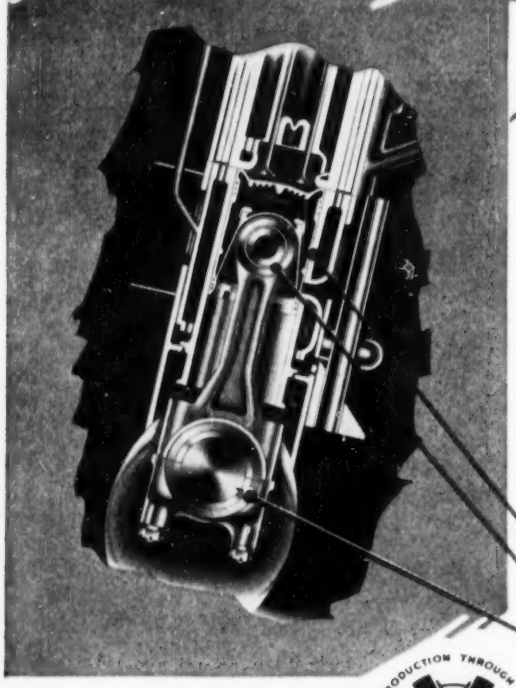
Larger state activity in labor relations is getting serious consideration from Congress.

One plan is to exempt from the Taft-Hartley Act all small businesses with less than 10 employees and others having only a minor impact on interstate commerce—like the construction industry, local utilities and other businesses doing only a limited amount of interstate business.

Another is to leave the states free to regulate picketing and strikes, irrespective of any conflict with Taft-Hartley, and to respect state laws which ban compulsory union membership.

About 20 states now have laws regulating labor activities. It is assumed that more states would adopt "baby" Taft-Hartley acts if the Federal government cleared the way.





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—the cross head,

—the connecting rod . . . all which must hold the compression and transmit the terrific thrust are MICROHONED!

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Detroit

Ford is expected to spend $20 million for new equipment to modernize its engine plant at Windsor, Ont.

The program will get under way as soon as assembly operations are transferred to Ford's new $33-million assembly plant at Oakville, Ont, just west of Toronto.

Containing 32½ acres under one roof, Oakville is the biggest factory in Canada.

• • •

Canadian subsidiaries of US car manufacturers import a substantial volume of car parts from US factories. Body sections are a good example. So are automatic transmissions and frames.

About 70% of the content of Canadian-assembled cars is made in Canada. The Ottawa government stipulates a relatively high Canadian content to stimulate Canadian employment and to prevent Canada from being merely an assembly point.

Ford of Canada today has 1100 suppliers in 170 Canadian cities.

• • •

There's other automotive expansion of note. Here are some examples:

Ford has announced that it will build a new engine plant at Cleveland, where it already has a so-called automatic factory for manufacture of six-cylinder engines.

Details of the engine to be produced in the proposed plant have not been revealed.

Chances are that the facilities will be used to make eight-cylinder engines rather than to enlarge production of sixes.

Ford has just added projects ahead that will cost $512 million over the next few years. That will be on top of expenditures of $913 million in the 1946-1953 period.

Ford will replace its Louisville asembly plant with a new one of about 1,000,000 sq ft of floor space. Capacity will be 1100 cars a day. The present plant, built in 1925, can build 370 assemblies daily. Trucks will also be assembled. Cost: About $40-million. Employment: More than 2,000 workers.

Chevrolet, meanwhile, is not standing still. It will build a new spring and bumper plant on the outskirts of west Detroit this summer, the 27th of its chain of production and assembly plants. The 750,000 sq ft plant will be completed in June 1954, and will employ 1,000 people on two shifts.

• • •

Behind automotive facilities growth is the fact that production stays in the stratosphere. Car and truck output reached above 175,000 units a week, cars and trucks, U. S. and Canadian plants included, in periods when strikes failed to affect output.

Car assembly schedules will stay high, if railroad car estimates ahead are a criterion.

Projected second-quarter total will be 20% above last year. That would mean 1.8 million cars and trucks for the current quarter compared with 1.5 million in 1952.

• • •

Squeeze is being felt on military goods. The most notable recent example is the cancellation of the Lincoln-Mercury J-47 contract, intended for a new plant at Livonia. Lincoln-Mercury is using the plant for warehousing momentarily, has other plans for later.

• • •

At the same time, Chrysler's jet engine plant north of Detroit has begun deliveries of complicated jet turbine discs, the heart of the engine compressor. And, nearer downtown, the Hudson Motor Car Co airframe div has begun delivery of aft sections for the B-57 bomber, with shipments going to Glenn L Martin Co.

• • •

Chevrolet has begun production at Buffalo on a second line of aviation engines, R3350-85 turbo compound powerplants producing 3500 hp. Supplying Buffalo, ten Chevrolet plants make 636 different parts and outside suppliers furnish 1260 other pieces.

• • •

Finally, to round out the military notes, a new tank recovery vehicle will go into production before long at the Chrysler Detroit tank plant. Details are classified. So is volume.

• • •

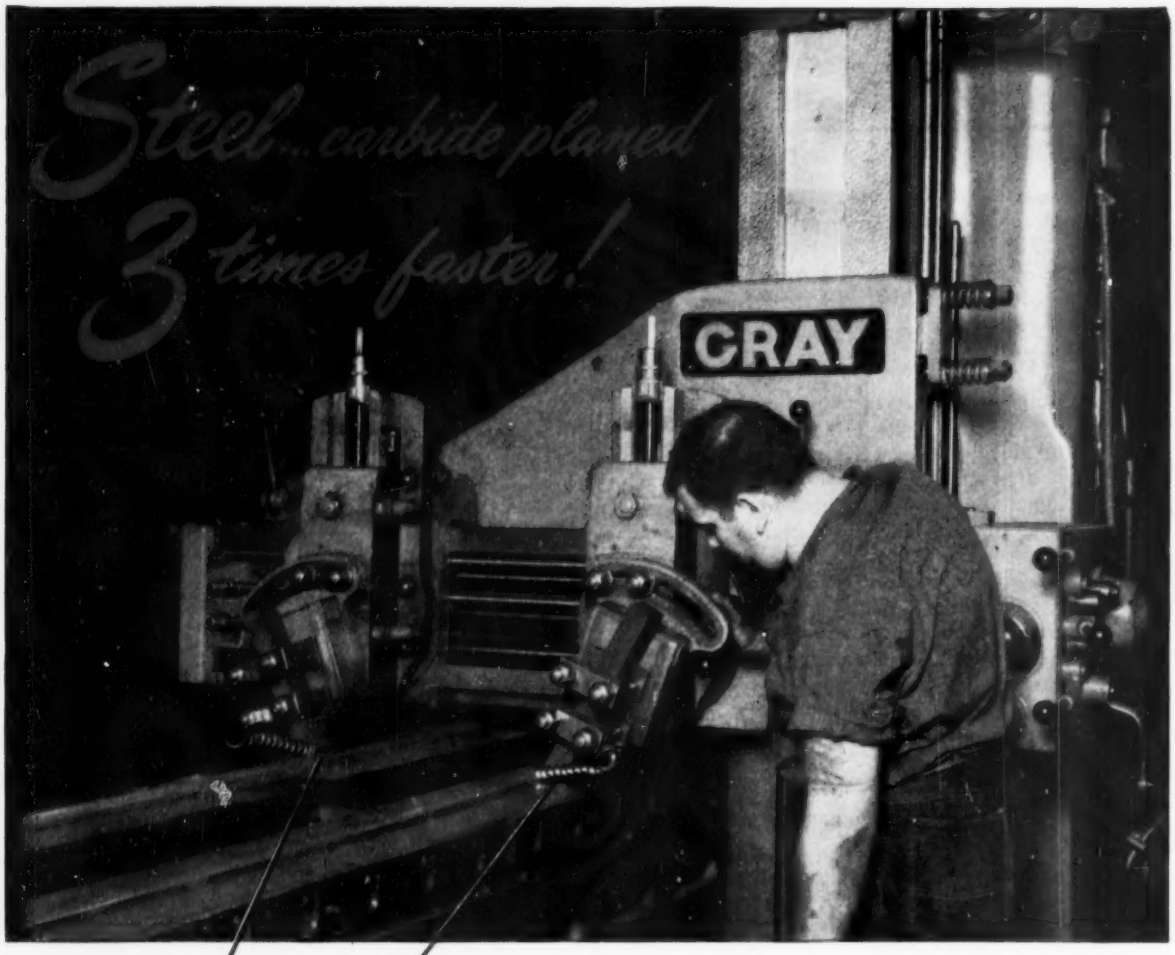
And Detroit Arsenal (tanks) has developed a new method of reconditioning, then retreading, tank road-wheels and tracks. It might be applicable to rail car wheels also. A special welding and machining process reworks guide flanges. They are built up by metallizing, then machined. Molds and presses of rolled steel, flexible enough to absorb irregularities of warped wheels (castings aren't) are then used to install the new tire.

• • •

One of the independents is well along on a new type of station wagon, said to take about $2 million out of tooling costs. Just how this is done is a prime riddle but competitors are reported to be hot on the track of the solution.

• • •

General Motors dealers, incidentally, are intrigued indeed to find their new top brass—president Harlow Curtice and major aides—turning up at their dealer meetings. They're pleased as punch, of course.



another cost saving performance record set by the **GRAY PLANER CUB**

Former planing time of steel bars and gibs was cut to ⅓ when this high speed GRAY PLANER CUB was put into action at a leading Midwestern metal fabricating plant.

This is accomplished by the Cub's high speed, greater power and tremendous rigidity—all essential to heavy duty carbide steel planing.

Proof of outstanding performance is the fact that this company has two more Cubs on order. Built in 24" — 30" — 36" sizes. Write for Bulletin 55. Dept. A

the job: planing hi-carbon, hi-chrome steel bars

cut speed 160' per min. • return speed 300' per min. • two heads • depth of cut 3/32" • feed .040

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Machine Tools

Most machine tool orders these days are for tooling for civilian products. No longer is Washington the focal point for the industry.

There probably will be a stepping up of defense orders, however, as the end of the federal fiscal year nears and unexpended funds are committed prior to July 1.

Once that is over, however, Pentagon is not sure how much machine tool business will stem from defense sources. The outlook is dim at best.

No one can be sure of what will happen until funds for fiscal 1954 are settled.

• • •

One point is crystal clear, though. The Vance Plan for broadening the mobilization base by creating more defense production capacity is almost sure to be carried out. It may take time, but the administration is committed to it.

Legislation that keeps the National Production Authority in being after June 30 will make it possible to leave M-41 undisturbed for the present.

Exhibit D (critical tools) will be continued the next few months. The present ratio of 70-30% for defense and civilian purposes respectively for builders of Exhibit D machines will not be changed.

The ratio of 60-40% for all other builders will continue too. Later on, the ratio probably will drop to 50-50%.

• • •

What's going to happen to government-owned machine tools after the defense emergency is the subject of much discussion in Washington.

Both the military and the machine tool industry agree that the government should retain in the national reserve all the machines that may be needed for current and future mobilization purposes. None of these machines should be allowed to go onto the commercial market.

From this point on, the services and the industry have divergent ideas. Pentagon would dispose of the remainder. That would mean public sale of one kind or another.

Air Force sold recently 228 surplus machine tools at Marietta, Ga, for $215,000. Scrap value of these machines was $52,000. These machines had been screened by government agencies before being offered to the public.

Some had missing parts and most were obsolete as far as present defense production methods are concerned.

• • •

That is the kind of sale that would be held in the future, if Pentagon has its way.

If the machine tool industry wants to take these old machines out of circulation, it should come up with a workable plan for trade-in allowances when government agencies want new machines. At least that's how the Pentagon sees it.

• • •

Reserve machine tools should be kept as near as possible to their present locations, and preferably by the contractors now using them. This would be desirable in the case of firms having only a few government machines.

Hundreds of metalworking companies are leasing anywhere from a few machines to 15-20.

But the armed services say that these machines will be stored in the custody of present contractors only if it is economical to do so. If the maintenance cost is too high, the machines should be moved to central warehouses.

• • •

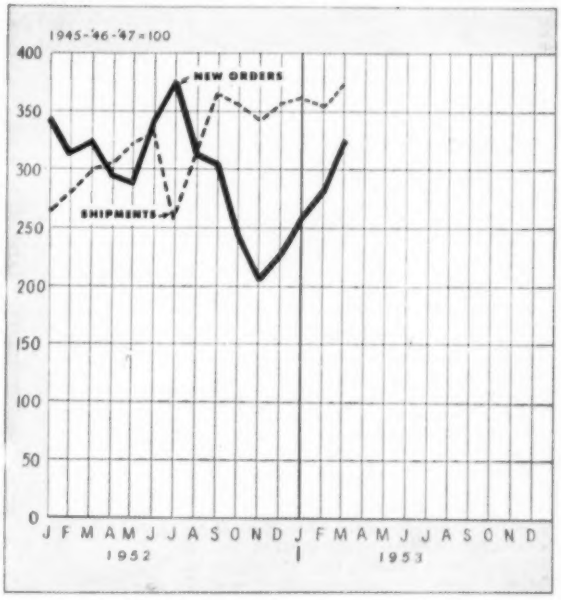
Pentagon is strongly opposed to allowing reserve machine tools to be used in civilian operations at the end of the defense work.

They should be kept idle in standby condition. If they were leased for use, they would deteriorate in service and would be of less value as a defense asset. What's more, they probably would be so dispersed around the country then that they could not quickly or easily be got back to the point needed.

The machine tool industry concurs with Pentagon in this opinion.

BF

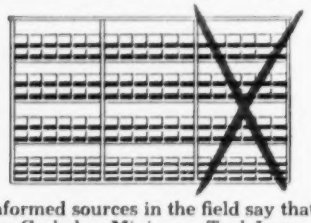
MACHINE TOOL ORDERS



NEWS ABOUT CREATED-METALS

Are Industry Inventories too High?

Business Week recently stated, "Don't underestimate the inventory problem. If a recession starts anytime in 1953, stocks of goods are likely to be at the bottom of it." *Iron Age* pointed out that, "hottest subject in automotive circles today is reducing tooling costs and shortening the tooling time cycle."

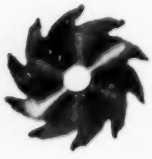


Informed sources in the field say that the Carboloy Minimum Tool Inventory Plan (described on these pages) is a forward step in answer to these problems as far as cutting tools are concerned.

★ ★ ★

Woodcutting Saws to Get New Teeth

The Carboloy organization has recently standardized production on 20 solid tungsten carbide tips for circular woodcutting saws. Saws with these carbide tips will soon be available from a number of saw manufacturers and offer phenomenal production increases over steel blades. Tool manufacturers can obtain details and prices by writing for Bulletin W.W.-53-1, Carboloy Department of General Electric Company (address at right).



★ ★ ★

Communications Given Boost by Magnets

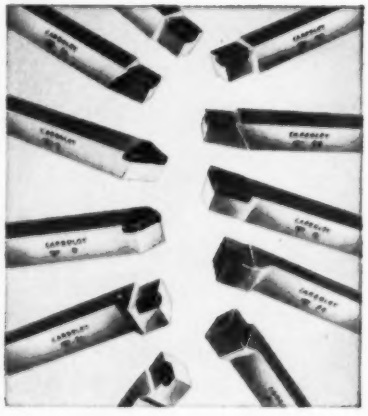
Because they help eliminate costly, bulky coils, Carboloy permanent magnets are being used more and more in communications equipment. The list includes loudspeakers for shops, radio, TV . . . other electrical components in telephones, transmitters, phonographs, hearing aids, etc.

These are the same Carboloy permanent magnets shop men find so useful for separating sheet steel, retrieving tools, holding jigs and doing other handy, timesaving jobs.

YOUR CARBOLOY SALES REPRESENTATIVE SAYS . . .

"Let us show you how up to 1/3

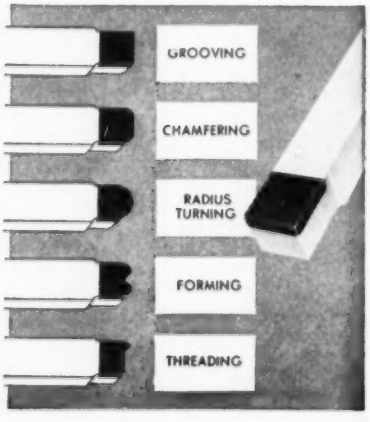
"OUR Minimum Tool Inventory Plan is the answer. It's an easy-to-adopt plan *that works!* Under it, you stock a basic number of low-cost Standard Carboloy Tools in place of many costly "specials." The proposal shows you how to adapt these Standards to almost any single-point tooling job . . . simply and quickly. You use your regular carbide equipment. You'll cut down production delays. You'll reduce your inventories *30% or more.* Read about it on these pages . . . "



1 What are Standard Carboloy Tools?

They are high-quality carbide-tipped single-point tools for turning, boring, facing and other machining operations. They outlast high-speed steel tools as much as 10 to 1 . . . will operate at machine speeds up to 4 or 5 times faster than ordinary tools.

There are only 11 styles of Carboloy Standards. They can be used "as is," or ground – in minutes – to do up to 80% of your single-point tool machining jobs. Carboloy Standards are as near as your phone, too. They are stocked in your area by Authorized Carboloy Distributors.



2 Here's how they adapt to your jobs.

At left is a style C Standard Carboloy Tool – one of the 11 styles. Note the generous-sized carbide tip. It can be used "as is" for some jobs . . . or adapted to meet any number of your special tooling requirements (as the 5 typical, adapted shapes at left, for example).

Carboloy Standards can be ground quickly in your own tool room, using an ordinary silicon carbide wheel for the rough grind, a diamond wheel only for sharpening. With a minimum stock of Standards on your shelves, you'll be able to get up to 80% of your single-point machining jobs rolling in a hurry.

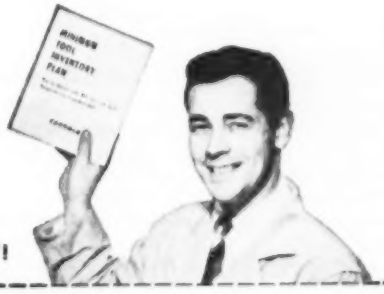
to reduce your single-point tool stocks . . . with Standard Carboloy Tools!"

3 Here's why the Minimum Tool Inventory Plan (MTIP) will work for you.

The Carboloy MTIP includes all the helps you'll need to standardize your single-point machining jobs with Carboloy Standard Tools. Send for the free MTIP kit. When it arrives: (1) Review your special single-point blueprints, using the handy plastic Instant Tool Selectors (above) to choose in seconds the right Carboloy Standard Tool to adapt for each job. (2) Enter the findings on the Plan Sheet (above, center), filling in the "...Tools Recommended" section. *That's all there is to it!* Now you can quickly compute what Standards you'll need, how many to stock, how much they'll cost. You'll see at a glance how the MTIP reduces your inventories up to one-third or more . . . lowers initial tool investment, shortens delivery cycles . . . gives you other benefits shopwide.

4 A Carboloy Sales Representative or Distributor will make sure it works.

Before you adopt this plan you can, if you wish, have a carbide expert from the Carboloy factory, district office or nearby Carboloy distributor come to your plant . . . help you get the MTIP rolling. He knows what carbide grades to recommend for particular jobs. He'll show you how Standard Carboloy Tools can pay for themselves in increased production and downtime savings alone. His services cost you nothing.



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☐ Please rush me, at no cost or obligation, full details on your Minimum Tool Inventory Plan.

☐ Have your representative call, without obligation.

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Company _____

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City _____ Zone _____ State _____

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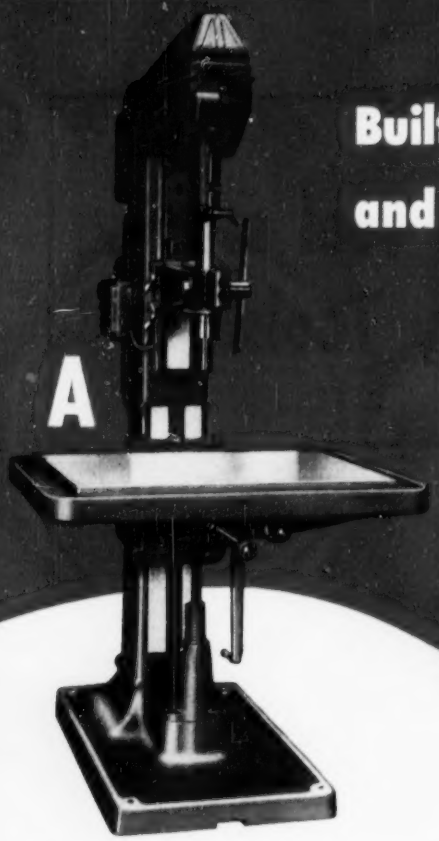
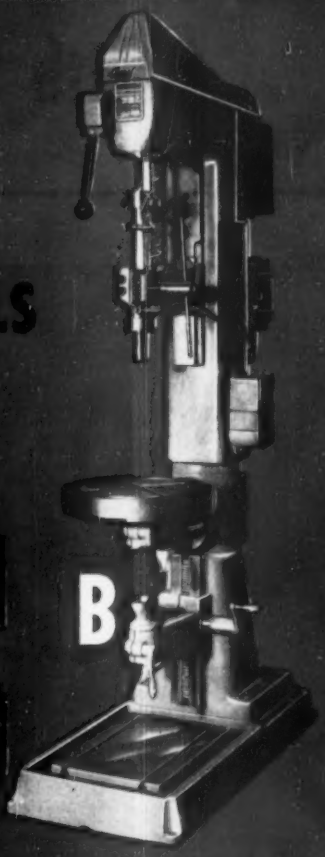
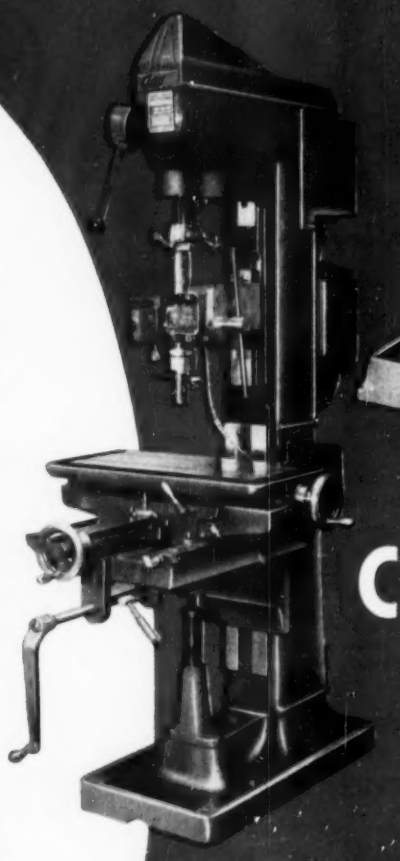


Avey BMA-6

TOOL ROOM DRILLS

Built in No. 2 and No. 3 Sizes





A. LARGE TABLE MACHINE—The large heavily ribbed table, 34" x 25" plus ample chip trough, allows room for large dies or fixtures, plus additional space for tooling, etc. Each six splined precision ground spindle and drive sleeve is supported by five rows of precision ball bearings which give the precision needed. The machine has six speeds which are easily obtained through a shifter lever, positioned in front of the machine. The machine also has three speed ranges, low, medium or high which are easily changeable for future jobs requiring higher or lower speeds.

All BMA-6 Machines may be obtained in hand feed, Avey-matic automatic feed, and power feed with or without reversing motor and control for tapping.

No. 2 BMA-6 Machines may be obtained with #2 or #3 Morse Taper, optional and #3 BMA-6 Machines may be obtained with #3 or #4 Morse Taper optional.

B. ROUND TABLE TOOL ROOM MACHINE—The drilling unit is mounted on a round table, lower column, and base. The base is planed and regularly furnished with two tee slots. Above the planed base is one auxiliary bracket adjustable vertically which may position a vee center, a cup center or an additional table. Beneath the spindle is positioned the regular round table, which is 18" in diameter and contains tee slots and coolant trough. This table may be tilted either way up to 90° or can be moved to the side or rear of the machine to allow work to be done on the lower table or planed base.

C. COMPOUND TABLE MACHINE—This machine is ideal for tool rooms and die shops and may be used for layout purposes which greatly assists jig bore work. The compound table is rigidly supported by a ball bearing mounted elevating screw and has vertical adjustment on the dovetail of the lower column. The working surface of the table is 25" x 12" plus ample chip and coolant trough. In and out travel of the table is 5" either way and cross travel is 7½" either way. Both tables are moved by Alloy Steel lead screws with automatic wear take up on screws.

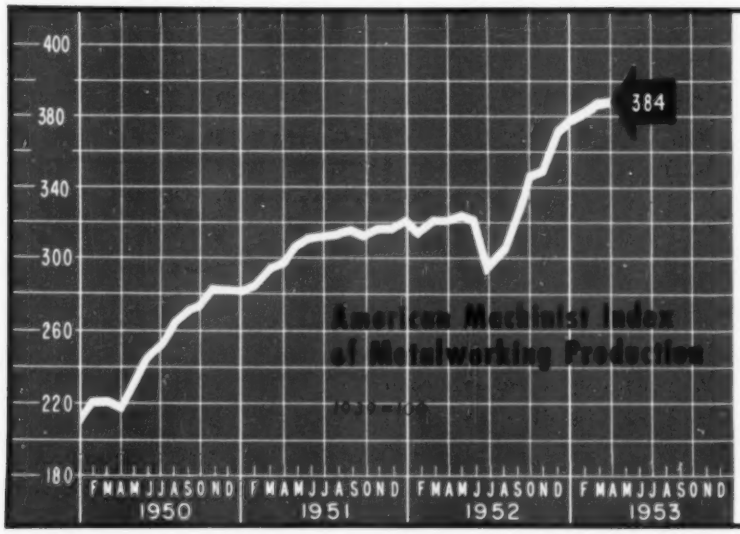
Both tables are scaled in ½" with dial reading on lead screws graduated to read .001. (one turn equals .250). Both tables have felt wipers on ways and table surface is regularly furnished with two longitudinal tee slots.

Consult the yellow pages in your phone book—under Machine Tools—for our nearest representative, or write direct to our factory.

Avey

THE AVEY DRILLING MACHINE CO. Cincinnati 1, Ohio

Gaging Metalworking



PRODUCTION INDEX
BASED ON MANHOURS WORKED IN THE FIVE COMPONENTS

	APR '53(*)	MAR '53(p)	FEB '53(r)	MAR '52
Tot. Index	**384**	**381**	**375**	**320**
Machinery	342	339	322	
Electrical Machinery	435	431	358	
Autos	308	298	214	
Other Transportation	603	594	512	
Other Metalworking	376	372	314	

(*) Estimated (p) preliminary (r) revised

The boom in Metalworking promises to continue into and probably through the third quarter.

Little if any effects of proposed cutbacks in defense work will be visible the next few months. The armament program will be one of the strong supports of metalworking operations all year.

• • •

The automobile manufacturing upsurge shows no sign of subsiding as summer approaches.

Parts orders from Detroit are at the same high level as during the past 90 days. What's more, auto makers' commitments for conversion steel are firm through the third quarter.

The market for many consumer goods, to the surprise of manufacturers, is still on the seller's side. It will stay there in the immediate future.

• • •

Production of heavy goods is at a peak rate. It may diminish as the year goes on, but not severely.

New orders, on the other hand, are not keeping up with output. The gap is widening rather than narrowing.

American Machinist's Index of Metalworking Production should continue to hover around its postwar high of 375-384 (1939 = 100).

Mass plant shutdowns for vacation will take their toll of production during July and August.

In Cleveland, a typical example, 259 out of 524 factories closed last year and the number will be larger this year. Demand for defense goods is not quite so loud and insistent as in 1952.

• • •

Steel mill bookings for next quarter are heavier than anticipated. Sheet and strip are in tight supply, with carbon bars and alloy steel not far behind. Small pipe and wire are freely available.

Inventories of steel in warehouses at the end of April were about the same as a month earlier —80% of normal. April sales were large.

Shell-making program is responsible for increasing trouble in getting large rounds and bar stock.

Nickel alloys are almost unattainable. Even chrome alloys are hard to secure.

• • •

Gray iron casting people are running at about 75%, but bear in mind that foundry capacity is much bigger than it used to be.

Customers are keeping a close eye on inventories of all materials.

Independent stamping shops are doing well, but find it almost impossible to get on schedule the type of flat-rolled steel required.

Material that can be plated economically is hard to come by. Altogether, stampers are upset because they cannot do an intelligent job of work scheduling.

New orders for stampings, however, are coming in in sizable volume from all sorts of producers of civilian goods.

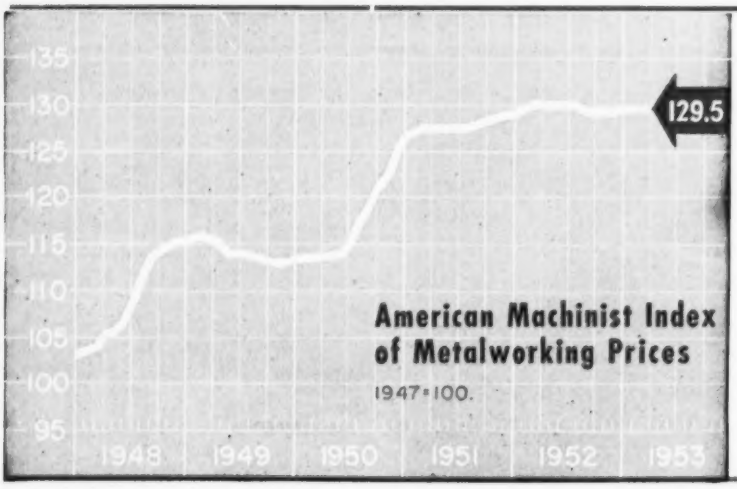
• • •

Employment situation in Metalworking is tightening further rather than easing. It is likely to stay at a peak level the next few months.

Farm implement makers report that most lines are selling well. But a buyer's market rules and increased sales efforts are necessary to keep volume up.

One point to remember from now on: Most end products, components and materials are more freely available. That fact should make purchasing agents more conservative in placing orders.

Gaging Business



PRICE INDEX

	APR '53(*)	MAR '52(p)	FEB '52(r)	MAR '52
Total Index	**129.5**	**129.5**	**129.8**	**129.8**
Metalworking Machinery	**137.9**	**187.8**	**136.6**	
Other Machinery exc. Electrical	**132.7**	**132.5**	**132.5**	
Electrical Machinery	**124.6**	**124.6**	**126.5**	
Fabricated Metal Products	**127.6**	**128.3**	**128.1**	

(*) Estimated (p) preliminary (r) revised

For the seventh consecutive month, industrial output is at a postwar high. But little change occurred between March and April—increased auto production was offset by a cutback in steel output and petroleum production.

Industrial output is up 10% since March 1952. Rising even faster are consumer durable goods. Radios are 64% ahead of last March. TV production, although it dropped 21% between February and March, is still 59% above a year ago. Major appliances are running 34% ahead of 1952, auto production is far ahead of March 1952.

Non-durable goods aren't doing quite as well—up only 6% over March a year ago. Textiles and rubber products lead the pack with a 14% gain. Chemicals, paper, leather and food gained less than 10% during the period.

• • •

Manufacturers' sales of motor vehicles and parts are running about 30% ahead of the corresponding period last year. February sales of other transportation equipment jumped 5% over January, 18% over Feb '52.

• • •

Manufacturers' inventories: autos up 14% this year but only 1% gain since the end of 1952; other transportation equipment, up nearly 25%.

• • •

Housing starts in March totaled 97,000—7% less than a year ago. One reason: construction delays due to heavy rainfall all over the country. Total starts for the first four months are estimated at 350,000. This is only 1% under the same 1952 period.

• • •

Employment rose more than 500,000 in March to a total of 61.5 million workers. This is a gain of 1,750,000 employed over March 1952. Conversely, unemployment dropped 100,000 in March from the February total of 1,800,000.

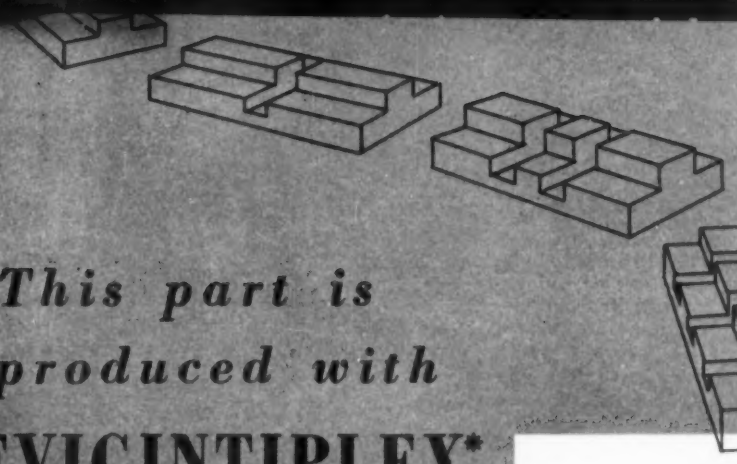
WEEKLY BUSINESS INDICATORS

	Latest Week	Preceding Week	Year Ago
Business Week Index of Activity (1923-1925 = 100)*	263.7	260.3	238.3
Steel ingot operation (thousands of tons)	2,262	2,276	1,083
Electric power output (million Kilowatt hours)	8,016	8,113	7,135
Production of automobiles and trucks	195,477	162,171	134,141
Engineering construction awards (*Eng. News-Record*—millions)	$373.1	$288.0	$288.2

MONTHLY BUSINESS INDICATORS

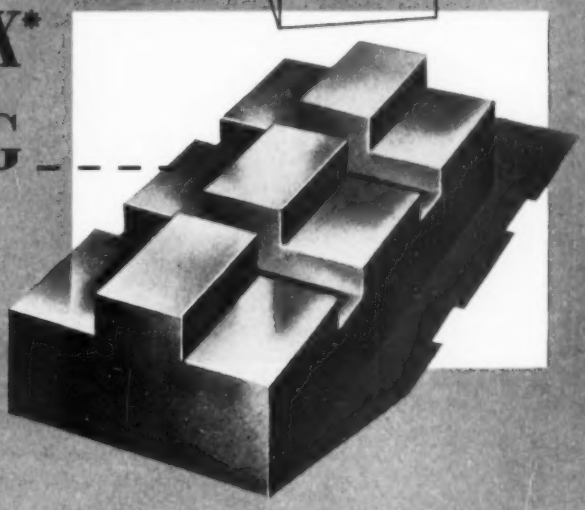
	Latest Month	Preceding Month	Year Ago
Index of industrial production (1935-1939 = 100)*	242	240	221
Index of durable manufactures production (1935-1939 = 100)*	327	322	285
Durable goods manufacturers' sales, millions*	$12,942	$12,195	$11,352
Electrical machinery manufacturers' sales, millions*	1,538	1,256	1,103
Other machinery manufacturers' sales, millions*	2,232	2,138	2,136
Durable goods manufacturers' new orders, millions	12,619	12,080	11,519
Electrical machinery manufacturers' new orders, millions	1,552	1,579	1,550
General machinery manufacturers' new orders, millions	1,821	1,784	1,984

* Seasonally adjusted



This part is produced with

UNDEVIGINTIPLEX* BROACH TOOLING



** to have nineteen-fold use*

A metal parts manufacturer recently asked Detroit Broach for broach tooling which could produce 19 different sizes of a similar part. Because production of each size was low, it was essential that a universal tooling set-up be created to realize the full economies of broaching.

The problem involved the broaching of a tongue and one, two or three cross slots in the metal parts which varied in width and length.

Detroit Broach engineers tackled the problem and came up with undevigintiplex tooling. Two stations were provided on a 25-ton single ram vertical broaching machine to broach the tongue and the cross slots. To take up for the variation in the cross slots of the 19 different sized parts, spacers were used between the broaches. And for the differences in width and length of the parts, inserts were used in the workholding fixture. Result . . . 19 different sized parts produced in a single tooling set-up!

This is just typical of the economies that can be had through universal broach tooling when a number of similar low production parts are needed by manufacturers. You, too, may have an application that can be materially reduced in time or cost by the economy of broaching. It will pay you to consult Detroit Broach for engineering or production data.

WORLD'S LARGEST MANUFACTURER OF BROACHES AND BROACHING TOOLS EXCLUSIVELY

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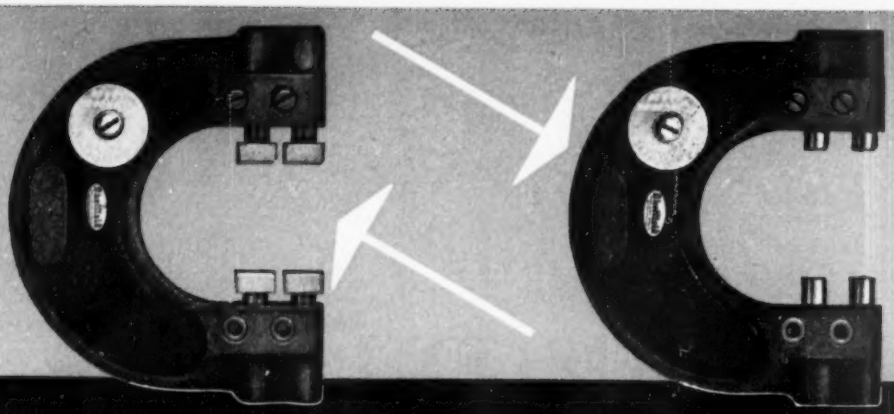

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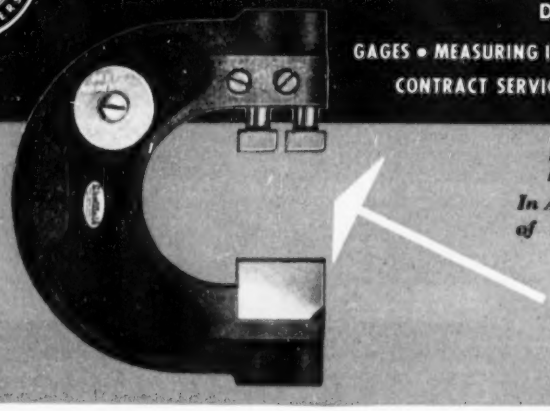

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American Machinist

MAGAZINE OF METALWORKING PRODUCTION ★ ESTABLISHED 1877

Materials Handling Rates Top Attention

In your search to cut costs, have you examined recently the possibilities of further mechanizing your handling?

Unless you are the exception, here is a problem worthy of your best efforts. Surveys show that the cost of materials handling covers a tremendous range, from 15% to as much as 75% of total manufacturing costs.

It is safe to say that, on the average, the cost is at least 25%. To put it another way, the operation of picking up and putting down materials, time after time, in many industries equals 50 tons for every ton of finished products manufactured.

That seems like appalling inefficiency and waste. It sharpens the comment of one trained observer that all handling that does not add value to the product should be mechanical.

THE MECHANICAL handling of materials is a complex problem, not a simple one. Its importance warrants that it be treated with respect from top management on down. It should not be segregated from everything else, but considered as an integral part of the manufacturing whole.

Its greatest benefits obviously stem from its application in brand-new factories. The plant site is selected with one eye on the ease of bringing in raw materials and storing them as closely as possible to the first production operation. The factory itself is laid out to minimize the unnecessary carrying of work in process.

Production processes and individual machines are grouped to reduce the amount of handling. Wherever possible, the automatic movement of materials from one machine to another is incorporated into the production line.

Some of the most spectacular cost savings, however, have been made by applying practical methods of materials handling in existing plants, especially in multi-story factories. The British figure that a steady, uninterrupted flow of materials to and from each operator, using existing production equipment, will raise productivity at least 15%. The savings should be even more in this country, with our higher volume of output.

FORD, in its engine plant at Cleveland, has a production line 1600 ft long occupying 46,000 sq ft of space that is equivalent to one vast machine. Mechanical handling is an essential ingredient in this automatic factory.

But small plants as well as Ford's mammoth operation can make use of the best principles of materials handling. Mere size of factory is no criterion of how well mechanical transfer of work can be applied. Remember, for one thing, that machines, no matter what their productive capacity, are limited by the amount of pieces fed into and taken out of them.

Efficient mechanical handling of work in your shop will bring you important tangible benefits. It will save you "muscle money"—direct-labor cost. It will enable you to get maximum usefulness from your large investment in tools and equipment.

It will increase the volume of turnover and decrease the volume of work in process. It will add to the capacity of existing buildings and lessen damage to your product. It will help to maintain standards of quality. It will reduce your indirect labor costs. It will help your operators to work better as a result of lessened fatigue and will conserve skilled productive labor.

ALTOGETHER, materials handling is one of your most valuable assets in increasing productivity in your plant. It is worth top attention now—and all the time.

Burnham Finney

Here a Cincinnati Press Brake saves 3 ways...

Built at The Maryland Drydock Company, for the Westinghouse Electric Corporation these giant condensers are some of the largest ever constructed.

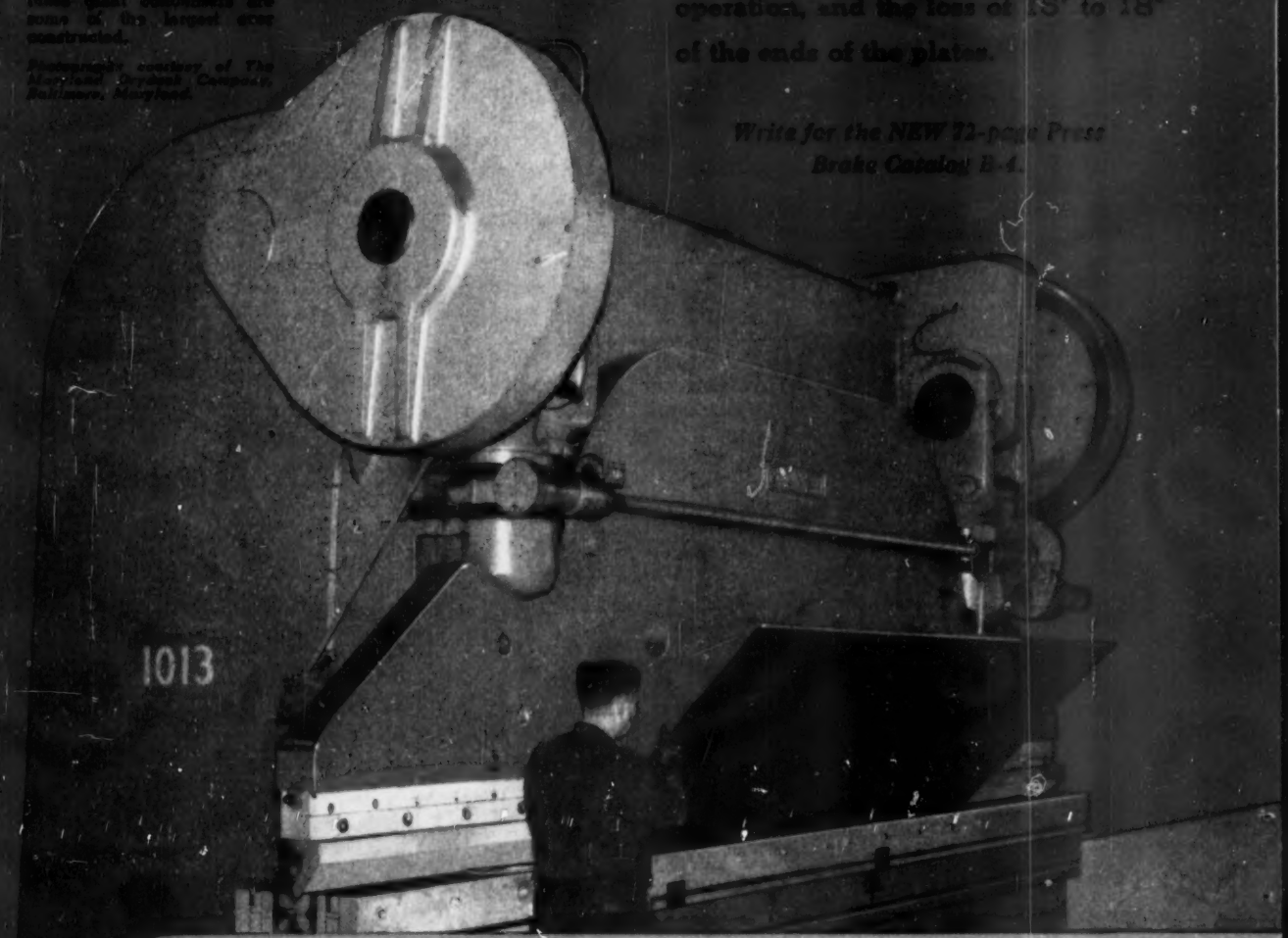
Photograph courtesy of The Maryland Drydock Company, Baltimore, Maryland.

- TIME
- NUMBER OF OPERATIONS
- MATERIAL

Crimping plate up to 3" thicknesses has cut roll-forming time in half at The Maryland Drydock Company.

The press brake crimps the ends of the plates with special dies, and has eliminated both the costly burning operation, and the loss of 15" to 18" of the ends of the plates.

Write for the NEW 72-page Press Brake Catalog B-4.



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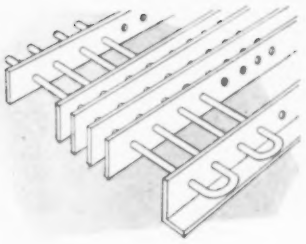
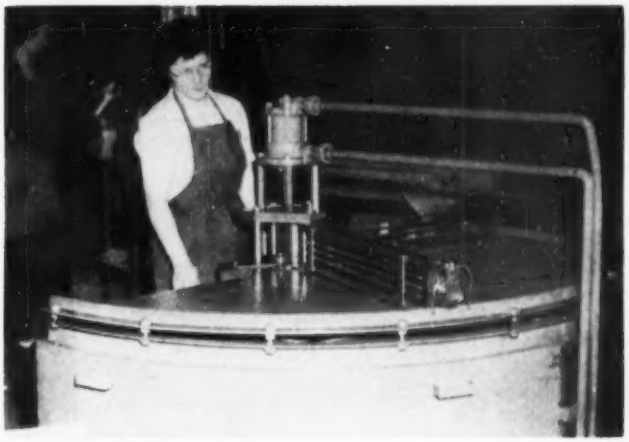


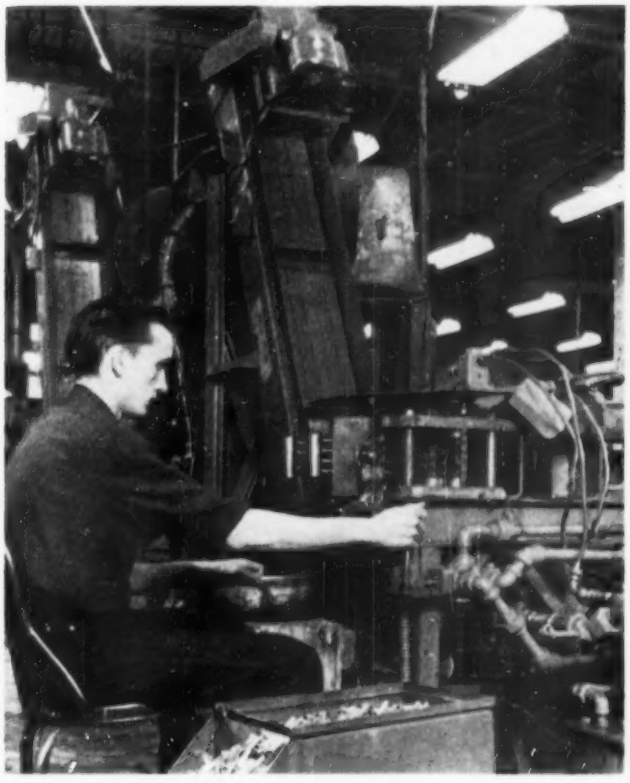
FINNED COILS MADE AUTOMATICALLY

Carrier has extensively mechanized a traditionally hand-done job, the making of air-conditioning and refrigeration coils . . . Here are highlights of the process in pictures, selected from the Coil Shop production line to illustrate principles that are broadly applicable

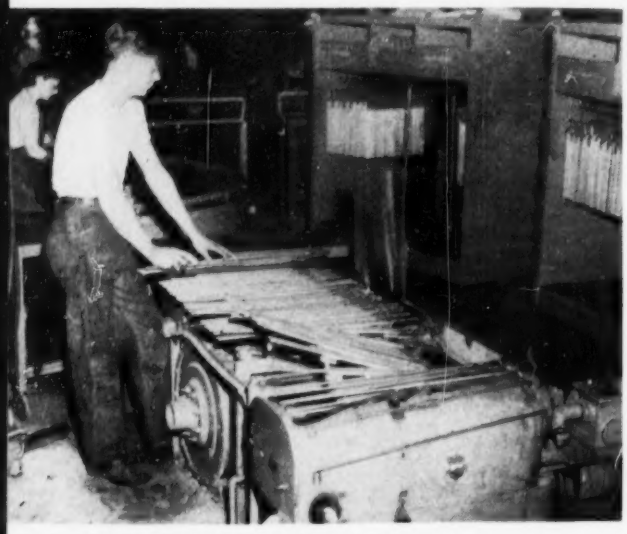
BY DONALD W PENNOCK
Factory Engineer,
CARRIER CORPORATION,
Syracuse, NY



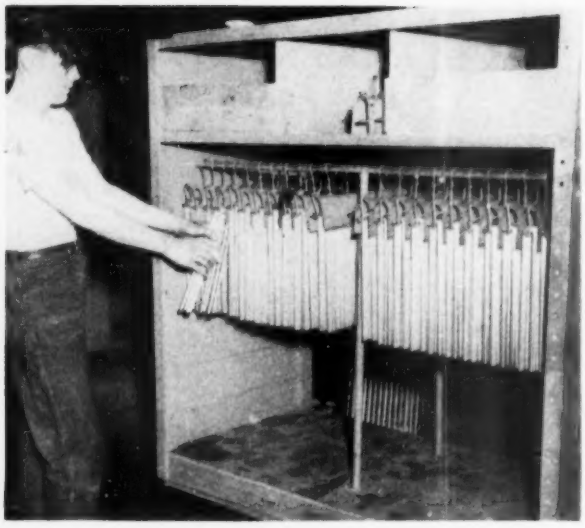
HAIRPIN TUBE-BENDING MACHINE, hydraulically operated, was designed and built at Carrier. The operator merely loads four pieces of straight copper tubing, pulls a valve lever, and the machine does the bending by sweeping the arm in the foreground. (Tubing for the hairpin machine and the return-bend machine is sawed to proper length by circular cutoff saws adjacent to bending-machine locations)



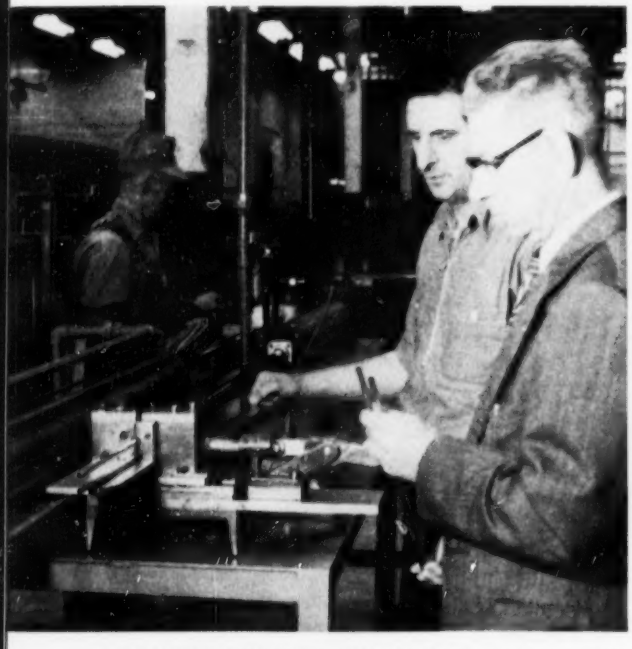
RETURN BENDS are made automatically at 1000 per hour in this machine setup. An operator loads the hydraulic return-bend machine at right with eight short straight pieces of copper tubing. The machine bends the pieces by geared rotation of quadrants and ejects onto the first conveyor, which feeds the hopper of the trimming machine (center, behind conveyor). Bends feed automatically from the hopper down the chute and are sawed off to length. From the trimmer they drop onto the next conveyor (left background) which feeds the hopper for the sizing machine. Next, they are automatically loaded on the feed chute, go through the sizing machine, and finally drop into a tote pan to complete the operation



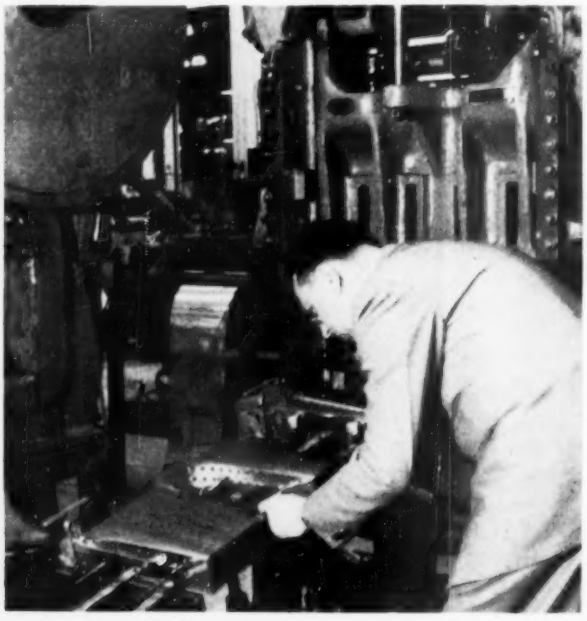
THIS AUTOMATIC ANNEALING MACHINE softens the work-hardened "hump" in hairpin tubes. This is necessary because the tube must be expanded evenly in a later operation. The operator loads hairpins on the motorized track conveyors, as shown. As the hairpins move along, they are flame heated, tilted and quenched in water, then loaded into cartridge-type racks (lower right) as they drop off the machine. Cycle dollies loaded with these racks may be seen in the background (right)



ANNEALED HAIRPIN TUBES are loaded automatically over a bar and under a U-shaped hood to protect them. The bar is held by swinging hooks, and the cartridge-type hairpin-tube hangers placed in this cycle dolly. Mounted on rubber-tired casters, cycle dollies can be easily moved between work stations, thereby preventing unnecessary lost motion. Dollies have compartments for tube sheets, protect tubes in transit, and permit quick estimates of production



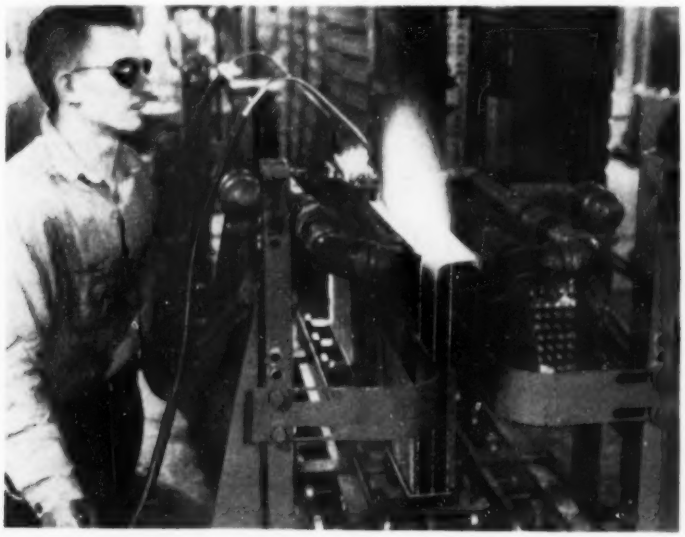
STRAIGHTENING HAIRPIN TUBING after bending is done on these two machines placed back to back. Each is simply a long-stroke air cylinder and piston which hooks the heel of the bend and draws the tube through split dies held together under adjustable clamping pressure. Here Harry Horn, general superintendent (extreme right), checks one of the hairpin tubes after straightening. Larger carriers, and the stands which carry them, are at left



FIN STOCK is brought to the presses in large coils. The coil is placed on a reel and fed through a "stock straightener," a set of rolls shown in the center of the picture between the two presses. The ribbon is then fed to a press. As it passes through, it is punched, crimped and sheared to its final form for assembly into coils. Upon ejection, it is caught by two fingers which enter holes in the fin and fed down parallel bars. Stop arms are available at several points along the bars, and end sections (joints are pin and socket) may be removed for convenience in handling and storing fins from press to assembly-fixture nest. Robert Benner, Coil Shop supervisor, here is scrutinizing fins being ejected onto the handling fixture

ASSEMBLY OF THE COIL is done in this hydraulic machine. From the special fin-handling fixtures conveniently placed over the machine and in front of the operator, 10 to 20 fins at a time are removed and placed in the assembly-nest fin slots. When the nest is filled with fins, it is rotated and tube sheets are added. Through the fins and sheets hairpin tubes are inserted. The nest is then returned to expanding position. Hydraulic pressure is released into the tubes, expanding them until they are immovable in the fins. The nest is returned to its loading position, the completed coil removed, and moved by roller conveyor to its return-bend installation station. A similar type of special machine is shown on our cover

TUBE-BELLING COSTS were cut in half in 1949 by using this double-ended belling tool in lieu of the single-head beller previously used. It is essentially a twin-spindle unit supported by a counterbalance. The tool also fixes the exact dimensional centers for the return bends, thereby improving assembly time and assuring better brazed joints. Pictured is one of the first coils belled. The same tool has proved very effective for belling tubes of coils of later design



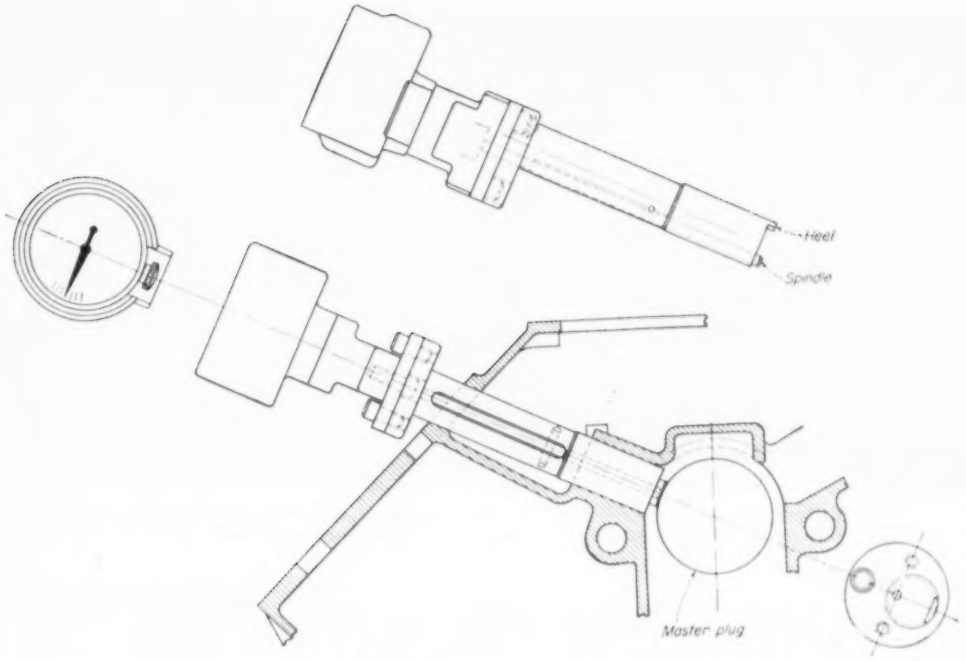
BRAZING 42 JOINTS IN ONE MINUTE, including loading time, is made possible by using this automatic brazing machine designed by Factory Engineering. The assembled coil, with brazing-wire rings on each joint, is loaded on a pallet and rolled on a conveyor between two ribbon-type gas burners. Brazing time is controlled by an automatic timing device to give the exact cycle time and heat control needed to make the best joints possible. In addition to saving a tremendous amount of time, the device eliminates human error and saves on gas used in the conventional single-joint hand-brazing method. Also shown is the gas-hose connection which feeds city gas through the coil during brazing to prevent oxides from forming. On small coils of this type, and similar ones of later design, Carrier has applied this method of brazing exclusively

INGENUITY PLAYED A BIG PART in design of this leak-test fitting. It is made up basically of four snap-tite fittings built into a common header. To leak-test a coil, the operator simply clamps the fitting on the four open tube ends, submerges the coil in the water tank at right, and opens the air line. Previously, air lines had to be soldered on and the connections broken after the test. Connection by the soldering method took three minutes; this method takes half a minute. This tool has been successfully applied to all coils of later design since its first application at Carrier

PRIOR TO 1953 PRODUCTION, this was the handling method used in baking coils. Pictured is a load of evaporator coils being removed from the baking oven on a basic-section rack trailer. As coils were finished on the assembly line, they were loaded onto the basic sections which were fitted with special wire dunnage racks. The feature of this system was that coils were processed and moved to the assembly line on the same sections without rehandling. Individual racks or tiers could be lifted from the trailer by overhead or floor-powered equipment and transferred directly to the unit assembly line or storage area. Today, however, all this work is done by conveyor as shown in the next picture

CONVEYORIZING OF COILS through the coil baking oven was adopted by Carrier for 1953 production. Here an employee is loading coils on the overhead conveyor. They will be cleaned, rinsed, painted and baked on this conveyor. Baking dehydrates the coil internally and dries paint on exterior surfaces

COILS EMERGING from the bake oven are blown out with dry air and capped with a plastic seal. They are then replaced on another overhead conveyor for delivery to the coil-storage area. Robert Benner (right) discusses bake-oven temperatures with the author



DODGE BURNISH-REAMS TAPPET HOLES

BY RUPERT LE GRAND, ASSOCIATE EDITOR

Tappet holes in Dodge "Red Ram" V-8 engines posed three problems for the master mechanics: (1) to hold size within 0.0005 in. tolerance; (2) to produce a mirror smooth surface in the hole, and (3) to maintain the hole square with the camshaft bearing centerline within 0.0005 in. per inch.

These requirements were further complicated by lack of space within the cylinder block casting for inserting a bushing plate to support drills and reamers against runout.

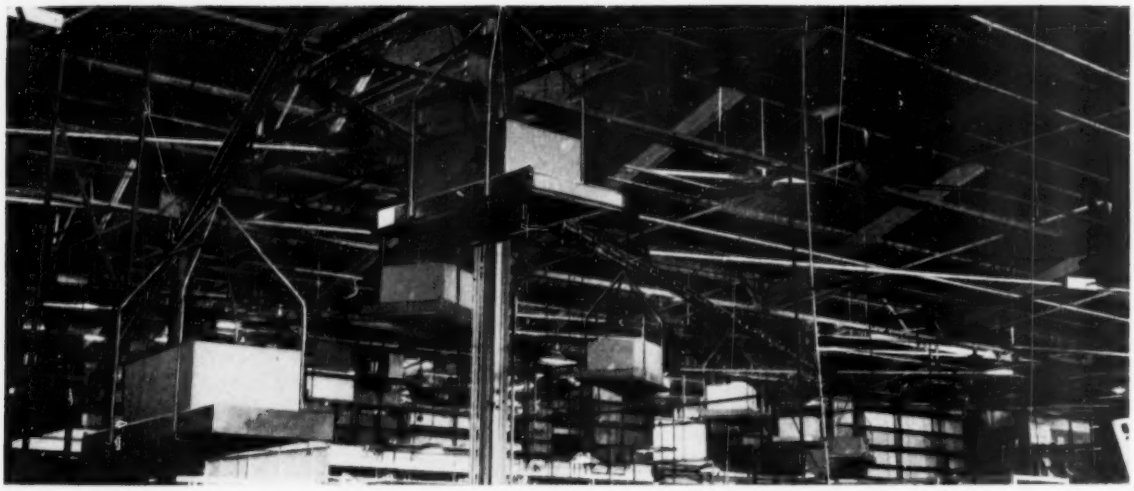
Production of suitable finish within the tappet hole was the most difficult problem to solve. Many ideas and tricks were tried. The successful one involves use of a six-blade tungsten-carbide reamer (0.9057 in. diameter) operated at a fast feed (0.090 ipr) and a slow speed (55 rpm). A standard Barber-Colman grind for cast iron is used. Action of the reamer, besides cutting, is to burnish the hole. The finish as seen against a strong light is mirror smooth with shadow patterns free of distortion. But there is more to producing the desired hole than the reaming.

To prevent the 61/64 drill running when drilling into a face at 25° from the drill, they had 16 indentations cast into this face, which also relieved the pressure against the bushing. This drills the clearance hole in the blank face, and also spots the tappet hole just like a center drill.

The first drill is ¾-in. dia, drilling tappet holes. A second drill opens the hole to 0.850-in. dia in a Greenlee transfer machine.

Boring is done in a Simplex transfer machine, using solid-carbide boring bars that inherently have sufficient rigidity to avoid chatter from overhang. Rough boring opens the hole to 0.885 in.; finish boring to 0.895 in. These holes are then semi-finish reamed, wire brushed to remove sharp corners at the oil hole, then finish-reamed with reamers held in Scully-Jones angular floating holders in a Cross transfer machine. Tappet holes are checked 100% with plug gages in an effort to hold size to 0.0003 in. tolerance, not the 0.0005 in. allowed.

Inspection of tappet holes for squareness with the camshaft-bearing centerline is done with a special dial-indicator gage. This device has a fixed protuberance, or heel, that touches the master plug gage inserted in the camshaft bearings, and a spindle with gaging anvil that actuates the dial indicator. After inserting the device in the tappet hole and noting the reading, the operator turns it 180° and takes a second reading.



OVERHEAD CONVEYOR has 3x6-ft carriers at 20-ft intervals. Conveyor handles large parts and supplies, serving 10 fabrication departments, cutting aisle traffic in half, and saving $10,000 per year

Super carriers cut congestion and cost

40% of all parts handling now is air-borne at Douglas Aircraft's Santa Monica plant. Aisles are open, damage is reduced, and costs are down because of a new overhead conveyor featuring huge carriers and automatic dispatching

By JOHN SHINN, LOS ANGELES

At Douglas Aircraft's Santa Monica plant, an ingenious overhead conveyor is saving the company an estimated $10,000 a year. Although the conveyor has turned out to be a money saver, original impetus was the necessity for relieving congestion and for levelling out work flow. Previously, all parts and supplies were moved from one department to another by trailer trains. Plantwide circuits were made twice a day. With this method, work arrived in surges at successive departments, and the six- to eight-trailer trains caused traffic problems in aisles. Moreover, trailers took up space while accumulating loads.

To relieve the situation, Douglas designed its own overhead system. A 3000-ft conveyor moves in a figure-eight pattern through 10 departments on three floors (basement, mail, and mezzanine) and between two buildings. Conveyor is a 4-in. Jervis B Webb overhead-chain type, which dips down to eight different stations. Suspended 6 ft below it by galvanized-iron-pipe supports are 3x6-ft carriers made of galvanized 12-gage sheet metal. Parts are loaded in heavy cardboard boxes. One end of the 6-in.-high sidewall is hinged and can be lowered. Rollers in the bottom of the carriers make it easy to slide boxes in and out.

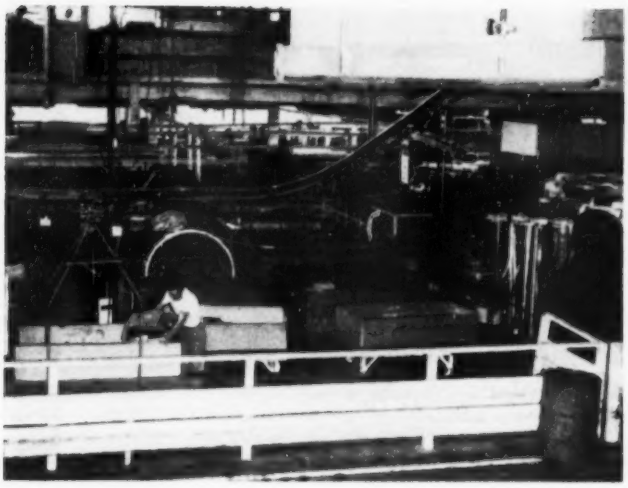
The conveyor is started and stopped at stations by an ingenious system of flags and switches. Each station has a limit switch at a different level. The forward right-hand support on each carrier has 10 different holes for positioning a fiber tab. (Only five holes are used, because only five of the eight stations receive as well as send parts.) When a carrier is loaded at Station 2, for example, with material for Station 4, the tab is set at the fourth hole; when the carrier reaches Station 4, the tab trips the switch and the carrier stops. A red signal lights on a small control box and a bell rings to call someone to unload.

To stop a carrier for loading, a toggle switch on the control box activates a limit switch which stops the conveyor when contacted by a lever arm on the conveyor chain just ahead of the next carrier.

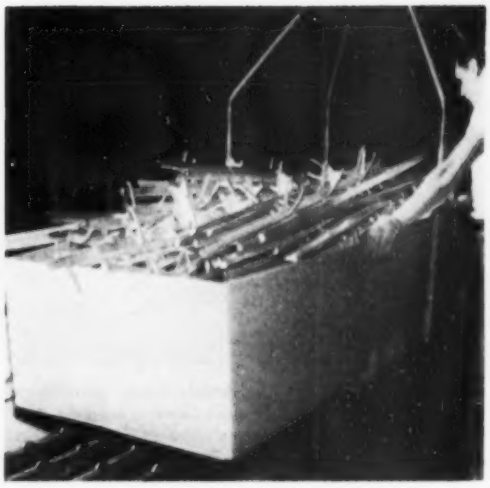
At first, carriers were hung from single trolleys. Too much swaying sometimes caused tabs to miss switches, so a second trolley was added and the carrier suspended from a load bar between the two. Guide rails at stations also control sway.

Powered by a single 5-hp drive unit, the conveyor moves at a rate of 40 fpm and is in motion about half the time. There are 97 carriers in the system, at 20-ft intervals. About 50 carriers move past any given point each hour.

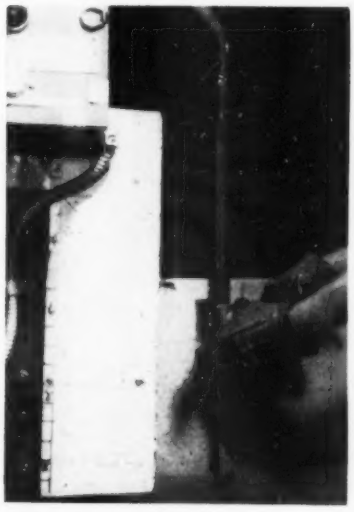
The conveyor, which will handle anything up to 6 ft long and 3 ft wide, services 10 different fabrication departments. Out of 23,000 in-



AT UNLOADING STATION conveyor dips down and stops automatically. Red signal lights and bell rings until someone comes to unload carton



CARTON OF FABRICATED PARTS is pushed out of carrier. End of carrier is hinged, and bottom is provided with skate wheels to make unloading easy.



AUTOMATIC DISPATCHING is done by setting flag at proper height to contact limit switch to stop carrier at destination. Stop and start buttons and red signal light are on box at upper left

BETWEEN BUILDINGS, conveyor moves within corrugated-iron passageway. Present plans call for extending conveyors 1000 to 1500 ft to serve machine shop, raw stock and receiving

and-out part movements each week, the conveyor handles about 18,000. This is about 40% of the total fabricated parts handled, plus templets and tooling, and empty boxes returned to stock areas.

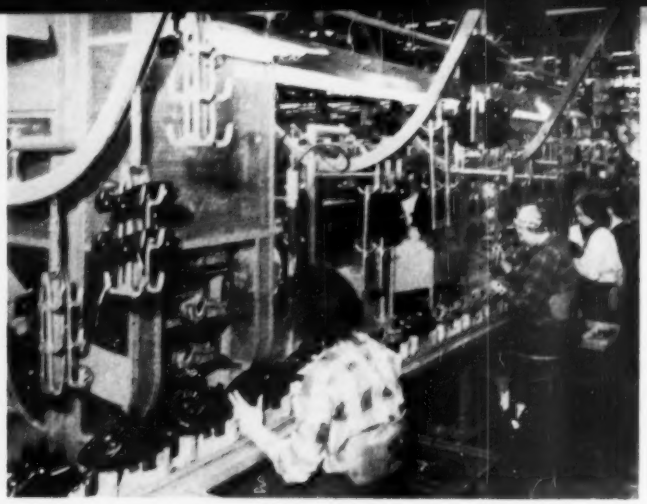
Under the old method, parts sometimes would take two days to get from one department to another, as trailers would not be moved until fully loaded. When a trailerload did arrive in a new department, it meant a sudden work surge. Now the maximum time to any department is one hour, and there is an even flow of work. Men who formerly had to be on hand to deal with intermittent peaks now have been reassigned.

Trailer trains still move large parts, but their use for fabricated parts has been cut almost by half, meaning 50% less aisle traffic. Considering greater utilization of space, savings in time, better manpower apportionment, and less damage to parts in handling, Douglas maintenance engineers estimate the conveyor means a yearly saving to the plant of at least $10,000.

Original cost was $50,000—$24,000 for the conveyor itself, $26,000 for carriers and work by the maintenance department. (Carriers cost only $40 apiece, as against approximately $120 for trailers and $2,000 for tractors.) Operation—including electricity and maintenance — is about 30c an hour.

The conveyor was designed to take care of future production increases, and production could be doubled without adding new carriers or speeding up the line. After a year's tryout, the plant is contemplating an extension of 1000-1500 ft to take in the machine shop, raw stock, and receiving. T C Knudson, of Douglas Santa Monica's plant engineering, was in over-all charge of design and installation.

TEN OVERHEAD CHAIN CONVEYORS handle parts and subassemblies in production area. Carriers designed for the part to be handled are shown dipping close to inspection station on subassembly bench where ringers are made. Fixtures carrying ringers move on belt conveyors in guides on bench surface. Fixtures turn corners on steel skid plate between straight belts running length and width of table



FINAL-ASSEMBLY CONVEYOR is served by four overhead chain conveyors. Each delivers subassemblies close to their point of use. Conveyors loop close to benches so there is little interference with traffic in aisles. Completed phone is inspected and cartonned for delivery to shipping department

• Highly mechanized in all departments, Western Electric's Indianapolis plant is loaded with cost-cutting ideas for better handling of parts, packages, and raw materials. Here are outstanding examples, showing how...

Clever Conveyorization Avoids Handling Headaches

TYPE 500 TELEPHONE developed recently by Bell Telephone Laboratories is produced in a highly conveyorized plant. Phone has improved transmission and receiving qualities, an adjustable ringer for volume control, and a pleasing streamlined appearance

BY P T MATHY
Factory Layout Engineer
Indianapolis Works
WESTERN ELECTRIC COMPANY

Manual handling of parts and materials was cut to the bone when Western Electric set up in Indianapolis the world's largest and most efficient telephone-set manufacturing plant. The result is an outstanding achievement in materials-handling engineering.

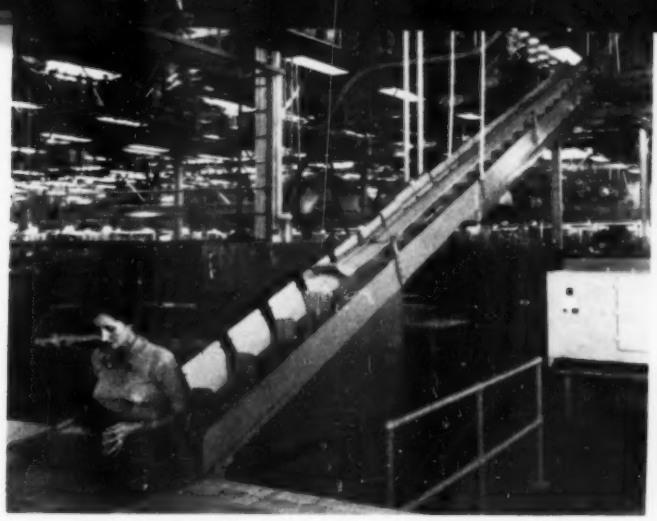
Receiving, storage, and shipping, together with other plant-service departments, are located under one end of the main manufacturing floor. More than 90% of all incoming material (2000 tons a month) is on highway trucks. These unload at six individual docks—all exhausted to remove engine fumes and equipped with interlocking doors arranged so the outside door cannot be opened in cold weather until the inner door has been closed. Submerged tracks also extend into the building at two locations.

Raw material is moved on skids by electric trucks via hydraulic elevators to first-operation machines in the manufacturing area. Parts in process are moved in steel stacking trays in which the gross load is limited to 65 lb. Four standard trays, with capacities ranging from 450 to 4500 cu in., are used.

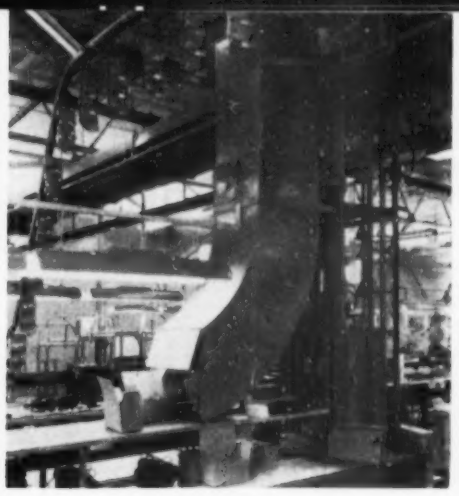
Trays of finished parts are stacked on lift skids for transfer by electric lift truck. A central storage area is provided for tray loads of parts made up in advance of assembly requirements to permit economic loading of assembly conveyors.

Conveyors in Manufacturing Areas

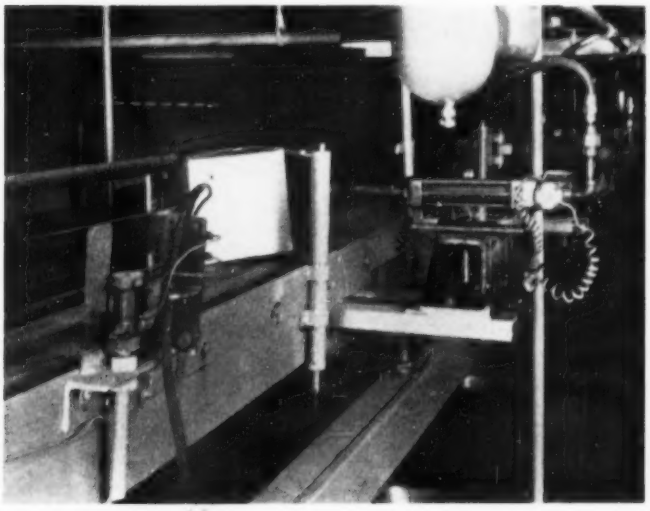
Within the manufacturing area, there are 14 separate overhead chain conveyors, with lengths varying from 160 to 2000 ft, and totaling 2½ miles. Speeds range



OVERHEAD BELT CONVEYOR takes cartons for individual packaging of completed telephone sets from point at which carbons are made up to chutes leading to packing positions at the three final-assembly benches. Photoelectric cells control deflectors to keep the three chutes full of empty cartons. Carton-makeup bench is more than 50 ft from nearest assembly bench



CHUTE delivers cartons to packing position. Packaged phones move from left to right into elevator that lifts them to same belt conveyor that brings cartons. As they leave packing position, cartons are identified with sprayed-on graphite dot. Height of dot above bottom of carton indicates types of telephone in carton and permits automatic sorting later on



AUTOMATIC SORTING DEVICE deflects packaged phones from belt conveyor near ceiling of lower-level packing area. Fingers on post (foreground) contact graphite dot on carton to determine which of six sorting chutes should receive carton. When pair of fingers make contact through graphite dot, solenoid valve actuates air cylinder to move gate and deflect carton to chute

ELONGATED HELICAL SKATE-WHEEL CONVEYORS receive cartons chuted automatically from belt conveyor near ceiling of lower-level packing department. Skate-wheel conveyor stores cartons ahead of packing. Eight cartons go into shipping cartons placed in racks in front of conveyors. Loaded shipping cartons are pushed onto gravity roller conveyor near floor

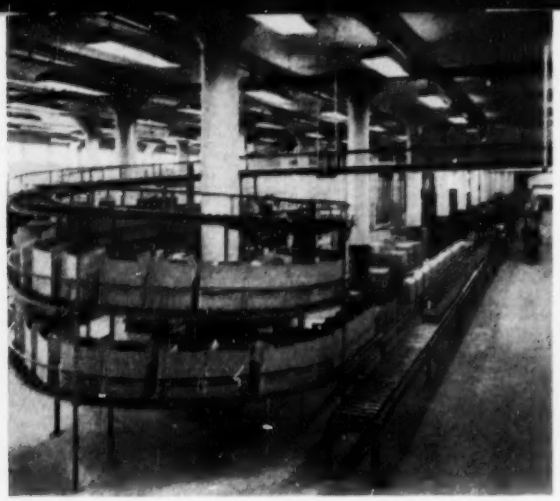
from 12 to 18 fpm. The design of conveyor carrier is varied to suit the parts each is to handle. Storage capacity of the various conveyors amounts to from one-third to more than a full shift's supply of parts or subassemblies.

Assembly is performed at benches incorporating belt conveyors in wide slots along their edges and ends. Boat-type fixtures move from station to station on these belts. Overhead conveyors dip to the positions where incoming parts are needed. Conveyors also loop close to inspection stations where fixtures are unloaded, assemblies are checked, and accepted units are loaded on the conveyor.

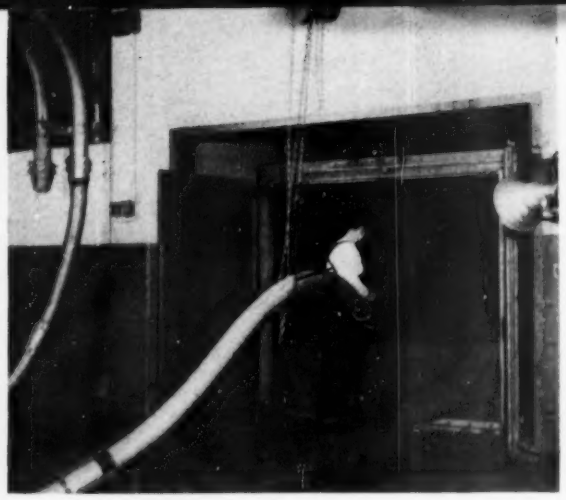
Completed telephone sets are packed in individual cartons before they leave the final-assembly benches. Cartons then are placed on a horizontal conveyor and, from that point on, all operations are automatic until the individual cartons are lifted manually from a conveyor to a shipping carton.

Automatic Handling to Shipping

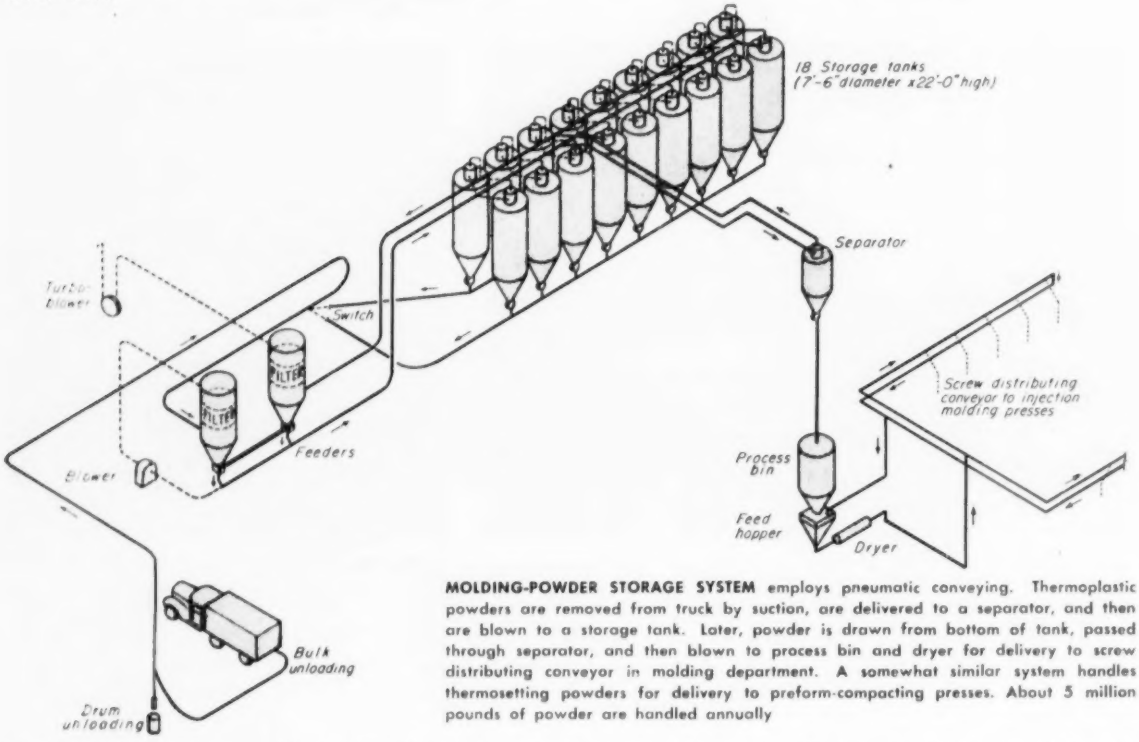
The horizontal transfer conveyor leading from the assembly bench is synchronized with an automatic elevator that lifts the individual cartons to a gathering belt conveyor up in the roof trusses. Before the carton enters the elevator, it passes a marking station where it trips a small limit switch connected through a solenoid valve to a paint-spray gun. Liquid graphite compound is sprayed through a mask



GRAVITY ROLLER CONVEYOR moves shipping cartons loaded with telephone sets from packing area to sealing and shipping line after they have been raised to ceiling height by belt-conveyor elevator. Level roller conveyor line at right holds cartons of other telephone apparatus which are to be closed and glued with same automatic carton sealer



PNEUMATIC CONVEYING transfers plastic molding powders from highway trucks to outdoor storage bins. Hose is connected to either of two pipelines (upper left) depending on whether thermosetting or thermoplastic powder is to be moved. Trucks are lined with stainless steel or canvas to facilitate cleaning



MOLDING-POWDER STORAGE SYSTEM employs pneumatic conveying. Thermoplastic powders are removed from truck by suction, are delivered to a separator, and then are blown to a storage tank. Later, powder is drawn from bottom of tank, passed through separator, and then blown to process bin and dryer for delivery to screw distributing conveyor in molding department. A somewhat similar system handles thermosetting powders for delivery to preform-compacting presses. About 5 million pounds of powder are handled annually

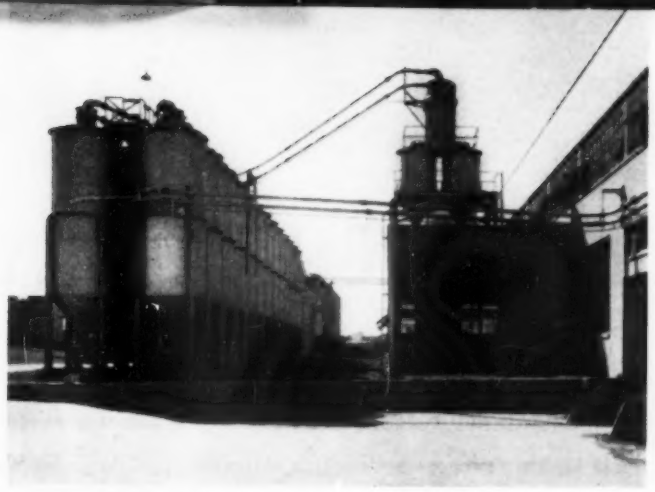
to form a ¾-in.-dia round dot on the side of the carton.

The height of this dot above the bottom of the carton can be set at any of six positions. Vertical position of the dot later serves to control a sorting unit which insures that all cartons containing the same type or style of telephone will go to the same shipping station. In this way, each of the three final-assembly benches can be producing entirely different telephone sets, yet there will be no mixed shipments when the product leaves the plant.

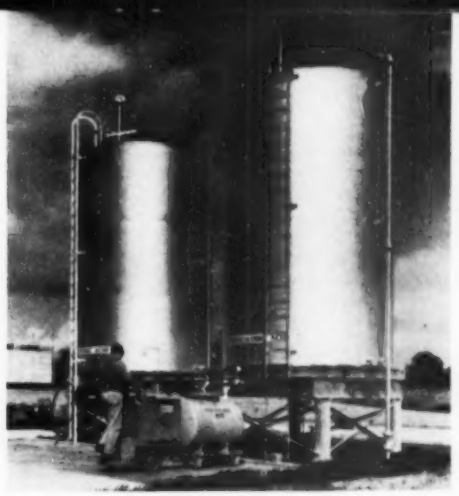
When the individual carton has been transferred to the elevator, and raised to the passing belt conveyor, a photoelectric cell actuates an air-operated pusher to move the carton onto the belt. But if a carton loaded onto the belt from one of the other assembly lines happens to be passing at the same time, a second photo cell de-energizes the pusher and stops the elevator until the carton has passed.

Cartons then are moved by the belt conveyor to a helical roller-skate gravity conveyor which lowers the cartons through a hole in the floor onto a short section of belt conveyor near the ceiling of the packaging department on the lower floor.

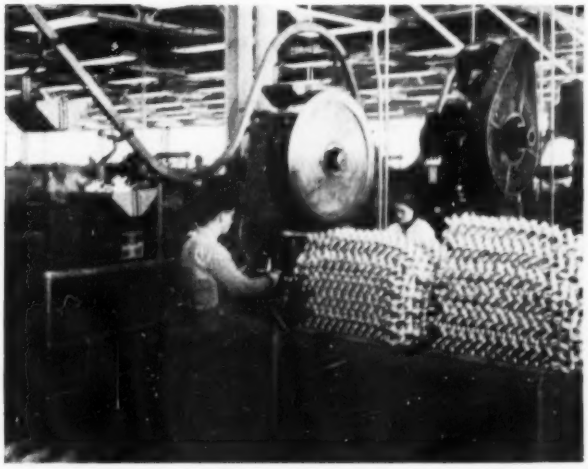
This belt moves the cartons past a series of electric contact fingers which ride on one side of the moving cartons. When a pair of these fingers passes over one of the graphite dots previously sprayed



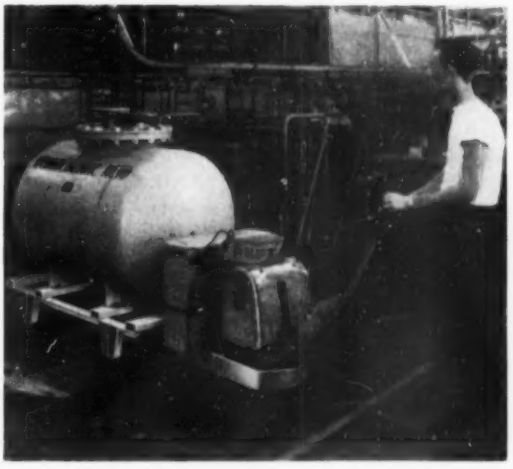
OUTDOOR STORAGE TANKS connected to pneumatic handling system hold nearly 200 tons of thermoplastic powder and some 350 tons of phenolic powder. This is enough to mold housings and handset handles for more than half a million telephones



STORAGE TANKS for hydrochloric and nitric acids are 16,000-gal. units. Acids are purchased in tank-car lots and are transferred with low-pressure air. The hydrochloric-acid tank and piping are made of steel which is rubber-lined. Stainless steel is used for the nitric-acid tank and its piping



SCRAP CONVEYOR in the diecasting department has automatically actuated dump buckets. These carry scrap from trimming presses to melting-furnace storage hopper. Here, levers on side of buckets are forced against stationary cams to open buckets and dump contents as conveyor moves. Photoelectric cell stops conveyor if sprue becomes entangled in bucket



POWER LIFT TRUCK moves hydrochloric and nitric acids into plating department in 225-gal. rubber-lined stainless-steel tanks. These are spotted adjacent to plating tanks and are connected to piping. Air at 5 psi transfers the acid

on the carton, an electric circuit is set up to actuate an air cylinder and thus move a deflector to guide that carton into the proper one of six chutes leading to helical skate-wheel storage conveyors.

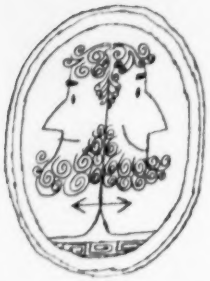
At the end of these conveyors, the individual cartons are loaded into shipping cartons. A combination of power and gravity conveyors move these cartons to the shipping department.

Handling Powders and Acids

Other unusual features of the materials-handling system devised for the Indianapolis Works are the methods used for handling thermoplastic and phenolic molding powders, plating-room acids, and flammable liquids.

More than 5,000,000 lb of plastic molding powders are received annually in bulk shipments by highway trucks. These powders are removed from the trucks and are delivered to storage bins or to hoppers in the molding departments by one of two pneumatic conveying systems — one for thermoplastic and the other for thermosetting material.

Storage tanks for the plastic powders are located outside the manufacturing building and have capacity for storing over a million pounds of plastic powders. Blowers and separators for the two pneumatic systems are housed in a building near the tanks. These pneumatic systems eliminated the need for handling, storing, and disposing of nearly 100 drums per day, reduced the cost of the molding materials, saved a considerable amount of floor space, and improved working conditions in the molding rooms.



INTEGRATE MATERIALS

Like Janus, ancient Roman god of gates and doors, materials handling is two-faced. It offers greatest present profit potential, but is also the greatest single cause of production downtime, of damages to materials and products, of crippling injuries to employees. Here's a step-by-step engineering approach

Properly engineered, materials handling is the biggest present opportunity for savings through increased productivity, a vital consideration in these days of increasing costs. From the national point of view, we will have to increase productivity about 40% in the next decade to take care of the 20 million increase in population expected.

Mishandled, materials handling can snarl production beyond belief. There is no blanket solution for the problem; each company and each field requires its own tailor-made approach. But there are these fundamental management steps:

1. **Learn all you can about this new tool.** See what other executives in your industry, and out of it, have done with it.

2. **Hire a good materials-handling engineer,** preferably experienced within your industry. He should be a mechanical or industrial engineer, well grounded in building construction, mechanical design, and industrial engineering, and specifically experienced in the application of modern materials-handling equipment and techniques.

3. **Define his responsibilities sharply and clearly,** based on your own plant and organization and the experience of other like plants. Give him direct help, men who are potential management material and know your business and procedure. The group head should be on a management level with the heads of tool engineering and production planning, have similar authority, and be coordinated with them.

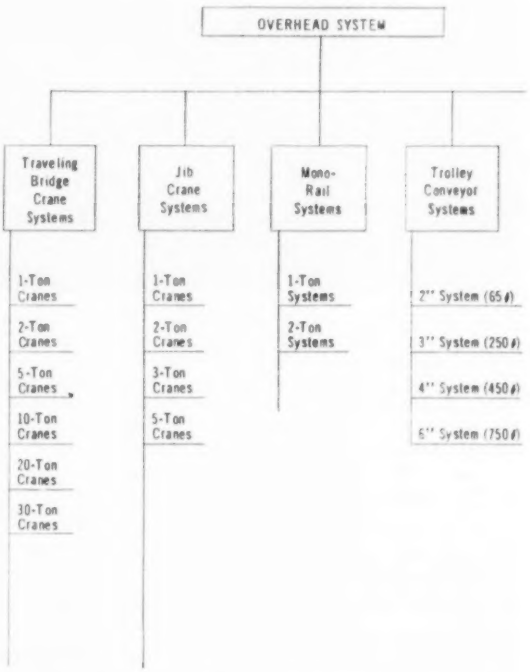
4. **Have him set up a materials-handling system.** This involves design, construction, purchase and operation of all equipment used primarily to store, move, or position material. It must be tied in at every level with production and service departments to insure lowest cost per unit of product. Insist on clear-cut planning on paper, with savings forecast in terms of reduced labor cost, increased production, or other improvements.

5. **Support him in his operations, particularly at the beginning,** when he faces the usual resistance from other executives opposed to change. To preclude confusion and misunderstanding, set up a written list of functions for the "Materials-Handling Engineering" (MHE) Dept—and see that it is understood and followed by all members of the MHE and other departments of the plant.

MHE FUNCTIONS

Here is a sample listing of functions, including packaging (which you may or may not want to include):

1. Plan, design, and create a coordinated, company-wide materials-handling system and main-



MATERIALS-HANDLING EQUIPMENT charted by system. This is one of several methods of classification, as worked out for a particular plant, but illustrates the approach

HANDLING WITH MANAGEMENT

tain it up to date from an engineering standpoint.

2. Design the system so that total cost per year shall be on a "lowest cost per unit produced" basis.

3. Standardize materials-handling equipment as much as possible to reduce equipment and maintenance costs, and to promote interchangeability of equipment between departments, divisions, and/or buildings.

4. Reallocate materials-handling equipment to suit changes in process or operation.

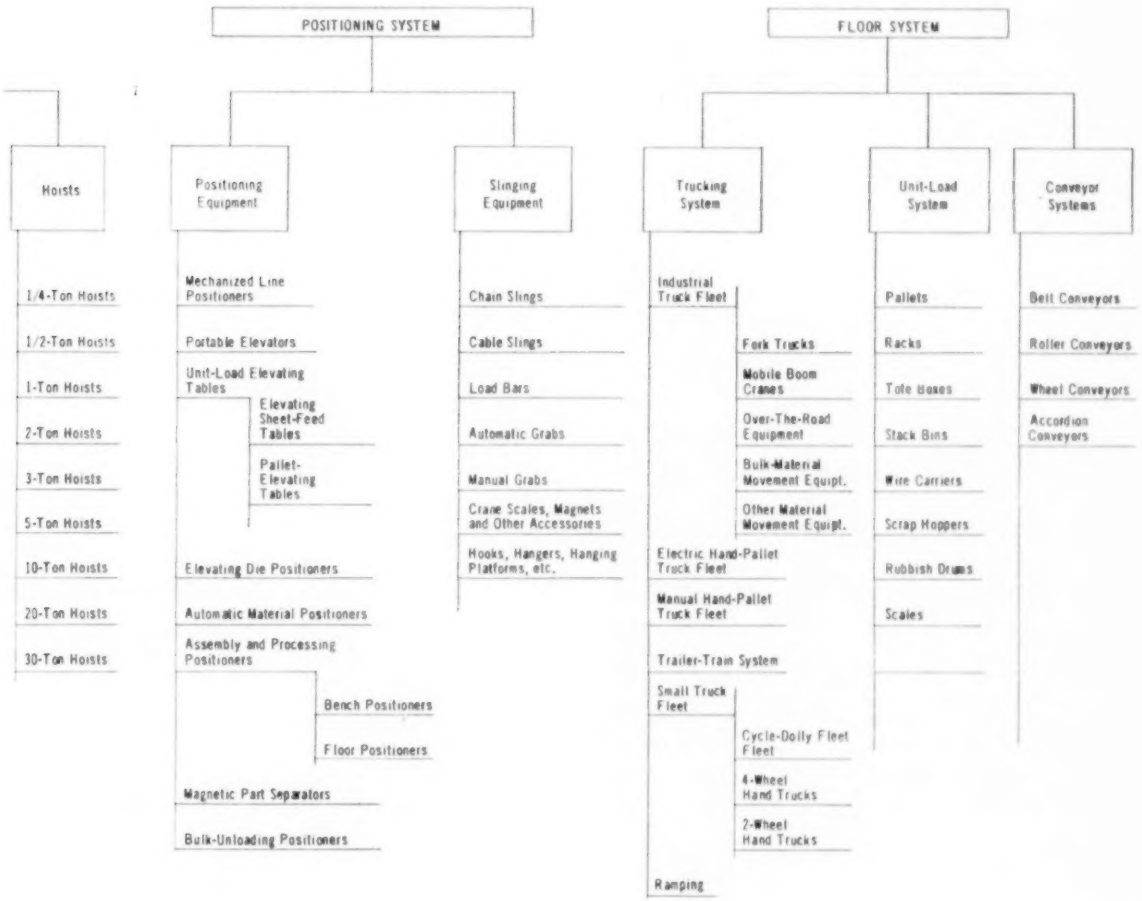
5. Plan and specify methods and means of receiving, storing, moving, positioning, packaging and shipping materials, equipment, and products.

6. Design, procure, install and supervise initial tests or operation of equipment for individual materials-handling jobs or programs.

7. Design and procure all initial packaging equipment and materials for new products and all replacement packaging equipment for any product.

MATERIALS-HANDLING CHART

To establish exactly what major equipment items and systems are the responsibility of the department, a chart like that shown can be prepared. This is just one way in which it might be done. Here, equipment is classified by system. In individual cases, it might be desirable to classify by kind of equipment, by relative mobility, by nature of material handled, by department serviced, or by nature of equipment served. Proper choice of classification must be based on your plant, your personnel, your production methods, and your product.



"Dispatching" Conveyor Speeds Small-Lot Handling

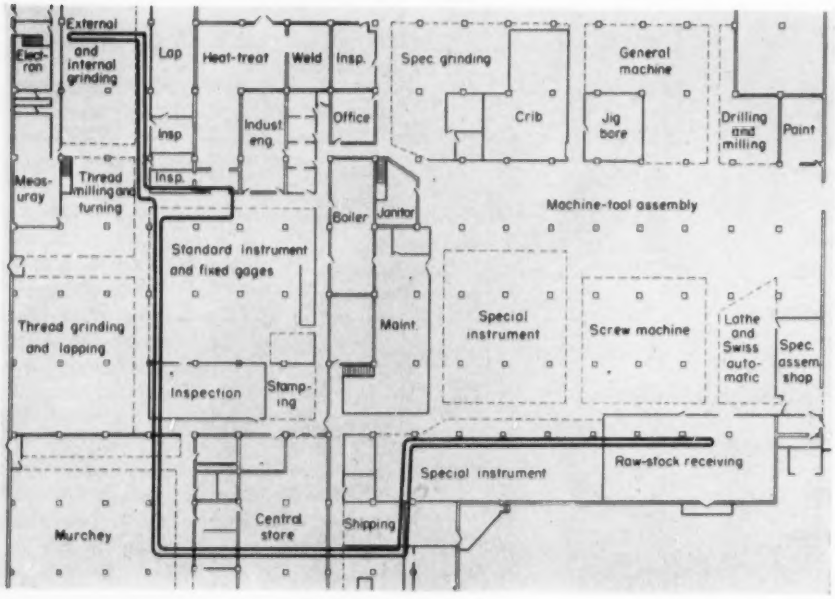
Faster in-plant movements,
less congestion,
and yearly savings of approximately $10,000 per year
in indirect labor are the pay-off
from conveyorized handling at Sheffield.
Automatic dispatching
overcomes the limitations of layouts,
providing both flexibility and direct-line flow of material

BY LOWELL EICKMAN, Chief Inspector
and EARL ADKINS, Factory Foreman
SHEFFIELD CORPORATION
DAYTON, OHIO

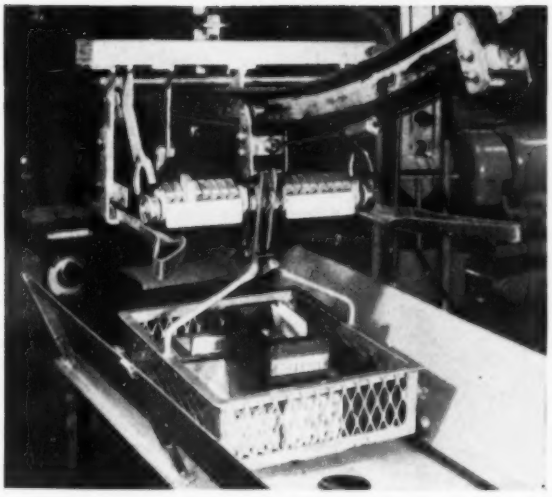
AUTOMATIC UNLOADING STATION includes tripping device that releases basket from carrier, also platform sloping back from release point so baskets roll by gravity down to bumper. Conveyor travels from left to right in picture

To reduce congestion in the aisles and delays in delivery of work from one department to another, we recently installed a 1200-ft overhead conveyor that provides continuous service to all areas of our Gage Mfg Division. Approximately 60% of the Division's production now travels by conveyor. Floor-level traffic is considerably improved and, as an added dividend, savings in indirect labor average around $10,000 per year.

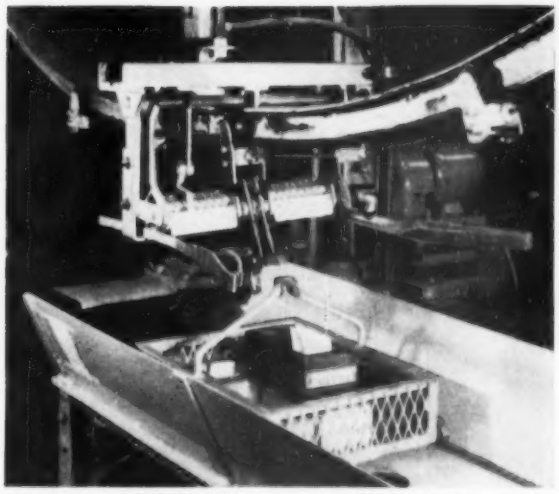
Prior to installing this system, all material was handled by hand truck. As the average small fixed gage has 8 to 12 operations, each in a different location, considerable travel is required. This is compli-



ROUTE OF CONVEYOR is laid out to provide service to 14 different departments and inspection areas. Cutoff bar stock for turning operations on lathes or screw machines moves by monorail to machines just outside receiving and storage area. Turned pieces and other cut stock then are loaded on conveyor at first station in receiving department. From this point, work can be dispatched for automatic unloading at any of 8 other stations. Layout is combination straight process and product groups, requires considerable movement between departments. Conveyor overcomes limitations of layout, providing flexible, fast service from department to department



BEFORE RELEASE OF BASKET CARRIER, wheels are supported by guide rails to prevent tilting. As carrier advances, stabilizer (U-shaped yoke) engages wheels to prevent twist. Stabilizer pivots freely around horizontal overhead support bar and returns to illustrated position by spring action after losing contact with carrier wheels



RELEASE OF BASKET OCCURS as adjustable trip dog on carrier (number 14) contacts fixed trip lever at unloading station. This unlocks hook which downward frees basket. Conveyor travel is from right to left in these pictures

cated by the fact that we produce more than 500 different items, often in several sizes. Orders usually are for small quantities and the operation sequence varies from one item to another.

With the type of conveyor that we have installed, layout is relatively unimportant. Material simply moves around the loop as far as is necessary to reach the next department. A complete circuit requires about 45 minutes. As service is continuous, there are no delays waiting for a trucker. Baskets of work can be loaded when orders are completed and within a few minutes arrive at the next operation. At present we have eight unloading stations, but our dispatching system can accommodate as many as 16 if necessary.

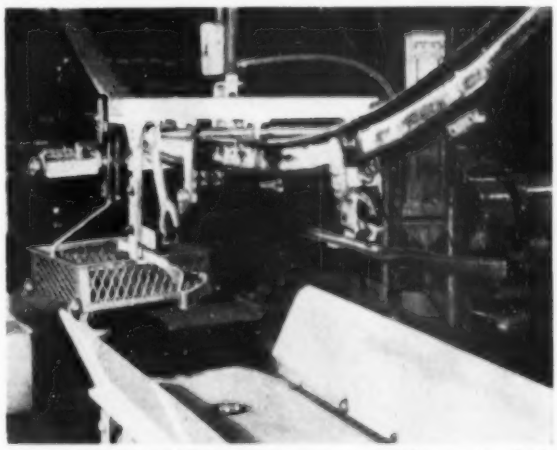
OVERHEAD CABLE CONVEYOR

The conveyor is a cable type with basket carriers every eight feet. In between are cable supports and driving lugs, with the latter spaced every 12 in. Selection of this type was made on the basis of low cost and anticipated low maintenance.

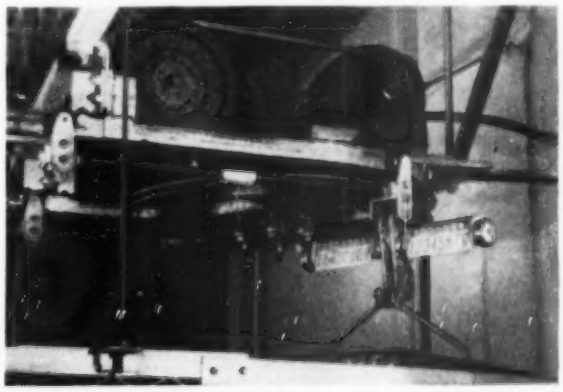
All baskets are the same size. These are large enough to hold the majority of gage items produced and, in fact, the average-size order normally received. They also are small enough to avoid twisting, which is important for automatic dispatching.

The dispatching system is a Sheffield design and is completely mechanical in operation. There is an individual trip dog on each carrier for each station in the system. These can be set according to the routing on the operating sheet which accompanies each order. At each unloading station is a fixed trip. When this engages the carrier trip, it releases the latch which holds the basket.

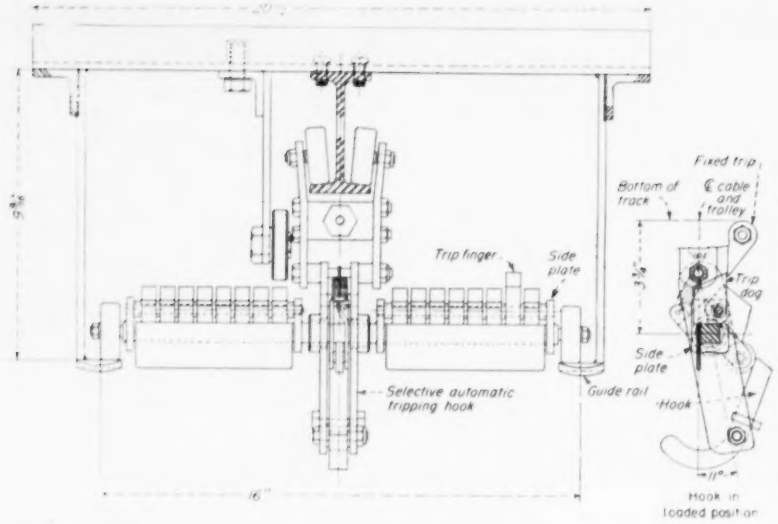
Attaching a basket is simply a matter of lifting one end, engaging the hook, and setting the latch.



AFTER RELEASE OF BASKET, carrier continues, stabilizer swings back into position to receive next carrier, and basket rolls down platform. Limit switch visible in center of platform stops conveyor if basket fails to roll back after its release from carrier. Second limit switch (not visible) stops conveyor if platform is filled to capacity



DRIVE AT EACH END OF CONVEYOR has ¾-hp motor working through special friction clutch that slips if jam occurs and tension builds up beyond pre-set limit. Trolley cable support, driving lug, and carrier trolley are visible from left to right on rail in foreground



SELECTIVE AUTOMATIC-TRIPPING CARRIER is actuated as trip dog engages fixed trip. Entire trip assembly rotates about square shaft on which wheels are mounted. This rotates roller upward, releasing hook; which pivots downward, releasing basket. As soon as dog clears fixed trip, spring snaps assembly back to normal position, automatically throwing trip dog down to its inoperative position. Each time a basket is loaded on conveyor a trip dog must be set for the proper unloading station. Hook must be returned to load position manually. Side plate holds shaft on which trip dogs are mounted. Small radius on fixed trip gives fast, snappy action to tripping operation

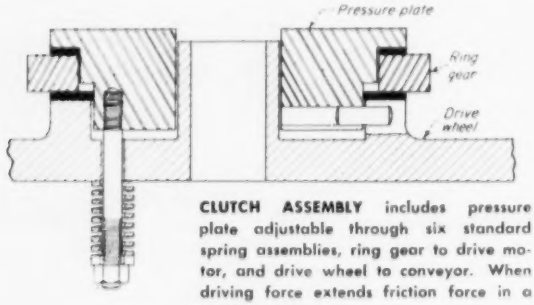
This often is done without stopping the conveyor. For heavy loads, however, the conveyor can be stopped by a pushbutton at each station. It then can be started only at the station at which it was stopped.

To insure the correct alignment of the carrier as it passes the trip point, a stabilizer and guide rails are employed at each unloading station. Wheels at each end of the carrier roll along angle-iron rails to prevent tilting around a horizontal axis parallel to the direction of travel. As the carrier nears the trip, a stabilizer engages the wheels to prevent twisting around the vertical axis. Guide channels also are provided along the rails above which the basket rides just before its release.

When the basket is released, it drops ⅛ to ⅜ in. to rails pitched away from the unloading point so the basket will roll by gravity to the end of the platform. Two types of platforms are used, depending upon the space available at the unloading station.

The preferred station is one in which the basket rolls away in the same direction as the conveyor travel. In this case, only one limit switch is required to prevent jamming. This switch is so positioned that it will stop the conveyor if baskets accumulate on the platforms until they back up to the point that they would interfere with the conveyor travel.

The second type of station is one in which the baskets must roll back into the opposite direction to the conveyor movement. In this case, a second limit switch is installed to stop the conveyor if a basket fails to roll back from the unloading point. While these are the only platforms actually in use, designs have been made for unloading at right angles to conveyor movement.



CLUTCH ASSEMBLY includes pressure plate adjustable through six standard spring assemblies, ring gear to drive motor, and drive wheel to conveyor. When driving force extends friction force in a jam, the drive slips

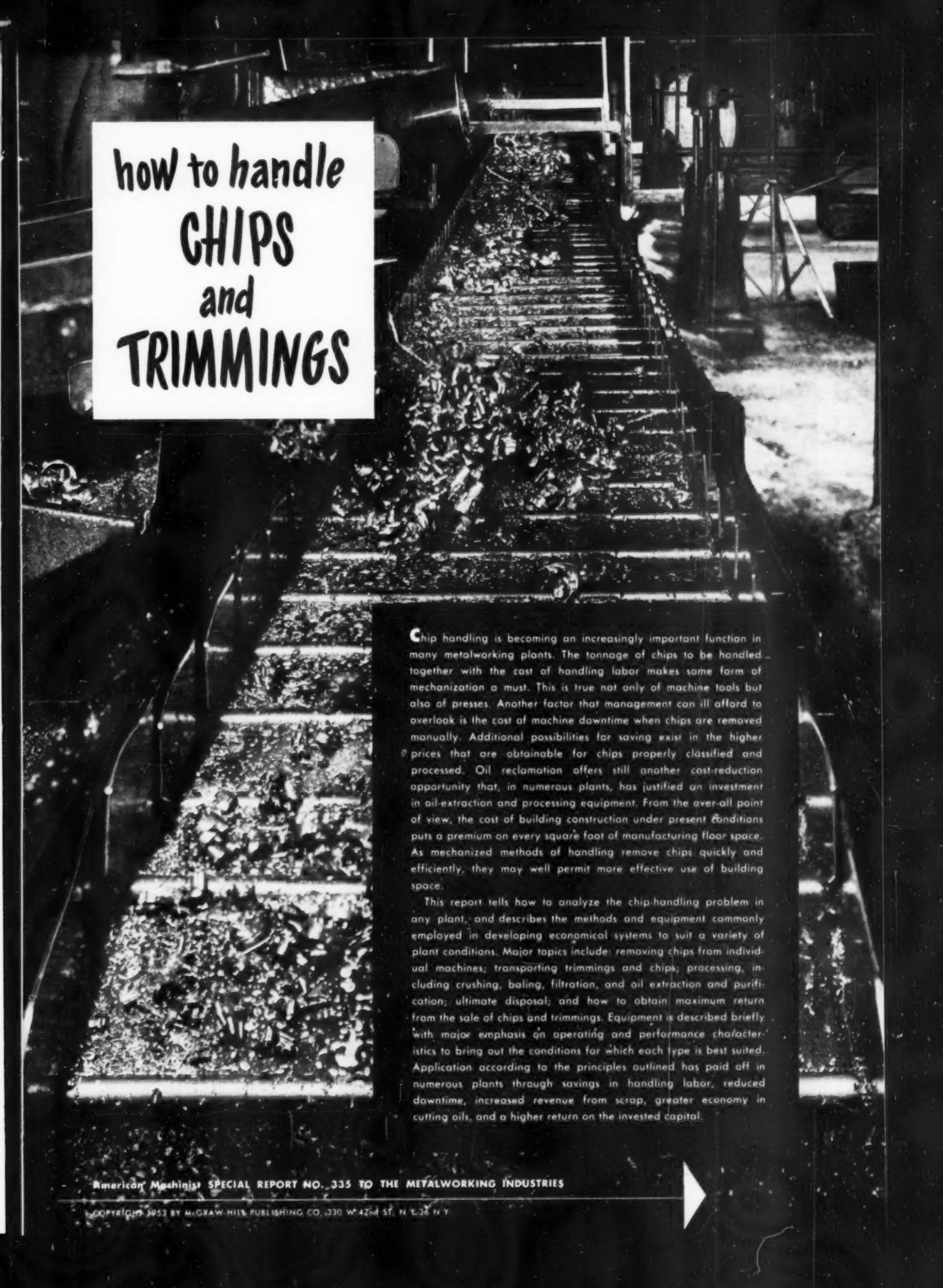
For safety, the conveyor drive is equipped with a slipping clutch which can be adjusted for any preset pressure. Initially, a direct chain drive was used, but this was noisy and would throw the baskets if a jam occurred. The present design overcomes these disadvantages. Protective screening also is provided under the entire conveyor run. Two drives are employed, each pulling at opposite ends of the system. Motors are ¾ hp, 1750 rpm, with speed reducers.

In planning the setup, the entire course of the conveyor was checked for ceiling heights, mounting points, clearances, and other building or service features that could cause interference or entail costly alterations. Considerable flexibility is possible in layout, as the conveyor will operate around a radius as short as 7 in. Clearance, of course, must be provided at turns to avoid interference across the diagonal of baskets moving in opposite directions.

For normal operation, 80 lb has been set as the maximum safe load. The system has been tested, however, with a 200-lb load dropped 3 in. onto the carrier support hook.

The cable-driving lugs and the conveyor drive have been planned on the basis of 1-ft units. An adjustment of 6 in. is possible in the drive mount, giving a 1-foot difference in the cable length. Initially, the cable lengthened because of twisting tighter and it was necessary to reset all lugs. The cable has maintained constant length since that time, however.

Unloading stations are located near the aisle and close to the desks of the foreman and production men. Incoming material is checked, and scheduling and dispatching within the department are determined. In this sense, material-handling is closely integrated with production control and planning. In effect, a control center is set up in each department.



how to handle CHIPS and TRIMMINGS

Chip handling is becoming an increasingly important function in many metalworking plants. The tonnage of chips to be handled together with the cost of handling labor makes some form of mechanization a must. This is true not only of machine tools but also of presses. Another factor that management can ill afford to overlook is the cost of machine downtime when chips are removed manually. Additional possibilities for saving exist in the higher prices that are obtainable for chips properly classified and processed. Oil reclamation offers still another cost-reduction opportunity that, in numerous plants, has justified an investment in oil-extraction and processing equipment. From the over-all point of view, the cost of building construction under present conditions puts a premium on every square foot of manufacturing floor space. As mechanized methods of handling remove chips quickly and efficiently, they may well permit more effective use of building space.

This report tells how to analyze the chip-handling problem in any plant, and describes the methods and equipment commonly employed in developing economical systems to suit a variety of plant conditions. Major topics include: removing chips from individual machines; transporting trimmings and chips; processing, including crushing, baling, filtration, and oil extraction and purification; ultimate disposal; and how to obtain maximum return from the sale of chips and trimmings. Equipment is described briefly, with major emphasis on operating and performance characteristics to bring out the conditions for which each type is best suited. Application according to the principles outlined has paid off in numerous plants through savings in handling labor, reduced downtime, increased revenue from scrap, greater economy in cutting oils, and a higher return on the invested capital.

American Machinist SPECIAL REPORT NO. 335 TO THE METALWORKING INDUSTRIES

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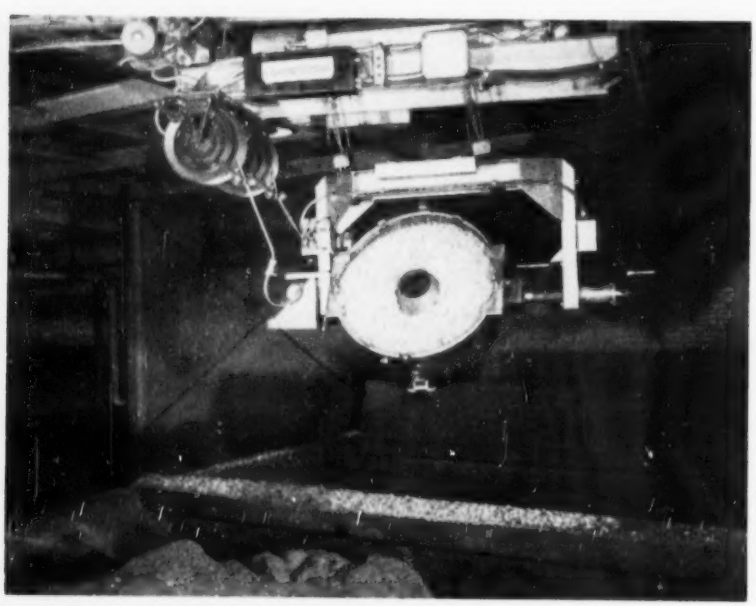
how to define

HOPPER PIVOTS ON CURVED SEGMENT to dump chips or trimmings. Weight of load causes dumping when truck operator releases latch. Hopper is counterbalanced to return to position shown when empty



MONORAIL SYSTEM MOVES CHIPS from processing area to trackside storage bins. Special carrier holds centrifuge basket. System features automatic dispatching to pre-selected bins and automatic dumping and return

The development and application of carbide tools has led to tremendous production increases in the metalworking industries. Accompanying this has been a similar increase in the tonnage of chips and turnings produced per shift in the average shop.

At the De Soto engine plant, for example, more than 27 tons of cast-iron and 6 tons of steel chips are cut during a single 8-hr period. (AM—March 16, '53, p 138.) This, of course, can hardly be called an average plant, but, on the other hand, its tonnages are far from tops in the metalworking industry. Even in the smaller shops, it is not uncommon to find chip outputs of 20 to 30 tons per week.

While the chip-handling load has increased greatly in the past decade, the cost of labor also has risen considerably. This means that, in many plants, it has become practical to mechanize chip-handling operations for the savings that can be realized through reducing labor costs.

Reduction in machine downtime is another factor that often weighs heavily in planning methods of removing chips and trimmings. In many cases, it is not possible to realize the full productive capacity of modern machine tools and presses unless adequate facilities are provided. While this is particularly evident in high-production setups, it also is true of jobbing operations.

Morgan Construction Co in Worcester, Mass, for example, found that savings in reduced downtime were enough to pay for chip conveyors on several engine lathes, turret lathes, and Bullards (AM—Feb 4, '52, p 104). This is a jobbing operation involving small lots and differing materials, yet the additional production time per day (measured by time study) through eliminating machine shut-downs

the chip-handling problem

for chip removal paid the cost of installing mechanized handling facilities in from one to two years.

A third consideration is the value of the chips produced. Copper, silver, and other metals with high scrap value often justify handling equipment and methods that would not be feasible purely on the basis of savings in handling labor or reductions in machine downtime. In one plant, for example, the value of a carload of crushed copper shavings from a wire-drawing operation was placed at nearly $20,000.

WHAT IS REQUIRED?

Plant chip-handling can be broken down into five major phases: removal from the machine tool or press; transportation to a central point; processing; ultimate disposal; and oil reclamation. Cutting-fluid systems also are tied in with chip handling in some cases.

Within this framework, considerable variability exists. Systems in some plants, for example, do not include all of the elements listed. And, in any plant, there are a number of different ways of performing the functions included in each phase.

Essentially, removal from the machine or press is performed manually, by gravity, by conveyor, or by sluicing. Transportation is by truck, conveyor, crane, monorail, or sluice. Processing at the central point may involve extraction of cutting oil from chips, chip crushing, baling of pressroom trimmings, purification of cutting oils, and clarification of water-soluble cutting fluids by filtering or some other means. Clarification may be part of a central system for delivering clean coolants direct to machine tools.

Ultimate disposal includes methods of transporting to the loading area, storage, and loading methods. Oil reclamation involves clarification and processing to restore valuable cutting oils to useable condition. In each area, there are a number of types of equipment and methods that can be developed to suit particular plant conditions.

The starting point is to define the problem. Tonnage produced per unit of time is the key figure. This may be expressed in pounds per hour or pounds per shift. If two or more shifts are involved, the figure should be the maximum for a single full shift. Taking a total for the plant or department for the day and dividing by the number of shifts may be misleading because of an incomplete second- or third-shift working force.

Attention may be focused on individual machines, on related groups of equipment, or on an entire department, depending upon the nature of the operations. Automatic bar machines, for example, often can be serviced in large groups with one or more conveyors. Chip removal in a miscellaneous machining area, on the other hand, usually is a batch-handling job. There also are cases where a single machine produces so many chips per hour that it justifies its own crushing and conveying setup.

A common method of determining chip tonnage is based upon output. Knowing production per hour and the weight differential between a rough casting, forging, or bar and the finish-machined piece, it then is possible to compute pounds of chips per hour for the machine or group of machines involved.

Segregation needs then must be considered. If low- and high-grade chips are mixed, the market price is that for the lowest grade. To obtain the best yield on chips, many plants set up a classification system as close as is practical, from an economic standpoint, to that of the scrap dealer. The chip-collection system, of course, must be adapted to the segregation needs of the classification system.

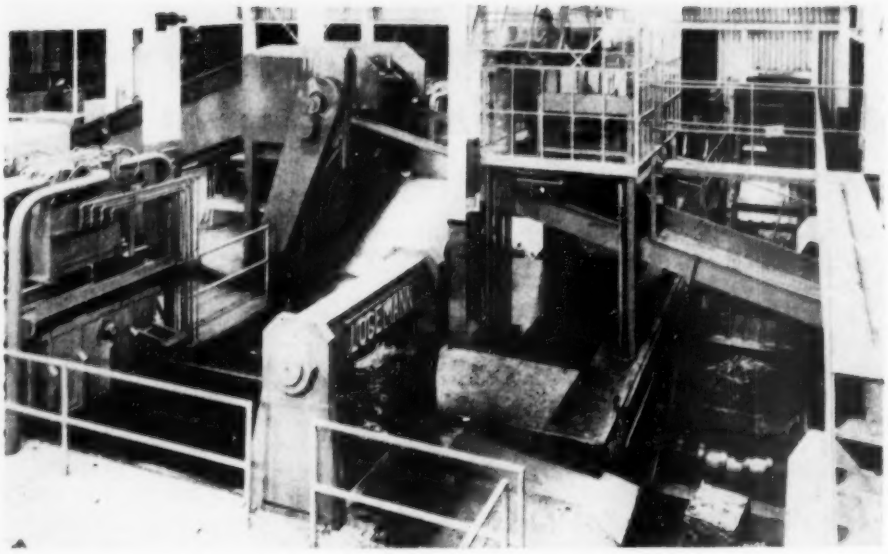
With pneumatic conveying, the type and viscosity of the cutting fluid has a bearing on the operating conditions which must be provided for most effective performance. The cutting-fluid specification should be noted if this type of conveying is to be considered.

Plant layout, routes, and distances must be figured. From this, duty cycles, equipment needs, travel time, and costs can be computed for batch vs continuous handling methods. In the latter case, methods of removal from individual machines, building obstructions, machine layout, and the need for any floor alterations must be taken into consideration.

BASIC HANDLING

In effect, the basic planning, selection of equipment, and system development up to this point follow the same principles that are applied in solving any materials-handling problem. A survey should be made to determine what has to be moved in what tonnages, over what routes, and on what schedules. Cost figures can be developed and the usual selection factors applied as regards batch vs continuous handling, floor vs overhead, etc.

Chip processing, ultimate disposal, and oil reclamation bring in other considerations. Crushing, for example, increases the value of chips, reduces their size, and increases their density. Much less storage space is required, as crushed chips take up only about a third the space occupied by uncrushed chips. Steel, aluminum, and copper-base alloys generally can be crushed to advantage. Cast iron has a naturally granular chip and seldom requires more than screening to remove foreign matter.



BALING PRESSES in double setup are served by apron conveyor between them. Operator works switch mechanism to feed presses alternately. Closing pressure of 380 tons squeezes about 1000 lb of pressroom steel scrap, which fills 120x60x48-in. hopper, into bale 20x18x24in. Each press produces 60 bales per hr at 40-50% density of solid steel

To recover valuable cutting oils, some method of extracting oil from chips normally is used. Centrifuges, or chip wringers, are commonly employed. Settling is another method. In either case, filtering and disinfecting often follow extraction. The importance of oil reclamation is indicated by the fact that as much as 30% of the cutting oil in a machine tool is removed on the chips. Some plants report that the savings in oil reclamation alone have paid for the cost of their entire chip-handling facilities.

When water-soluble coolants are employed, chips generally are not centrifuged. Settling tanks and filtration may be employed, however, depending upon the degree of clarity required. Central coolant systems in which the cutting fluid is clarified and returned to the machines are becoming increasingly evident. In some cases, chips are simply left on the crusher deck to drain before crushing.

Briquetting in Metalworking, for the most part, is employed by plants with their own foundries. Cast-iron briquettes are approximately 87% of the density of a solid piece of cast-iron. As briquettes require rather careful handling, however, plants that sell their chips and turnings normally ship them in the crushed state.

Baling is another method of increasing density and producing a compact, easy-to-handle bundle. Widely employed for pressroom trimmings and scrap, baling also can be applied to advantage on aluminum turnings (with corrugated board forming the outside of the bale) and on paper and other waste materials in the plant. As the ultimate user will pay a higher price for high-density trimmings in a shape that is convenient for handling and charging, bales bring a higher return on the market than does loose scrap.

After processing, the methods employed for ultimate disposal of chips and turnings depend to a large degree upon the quantity of material involved. In large-volume operations it may be possible to deliver crushed and dried chips directly to a gondola or box car. In most plants, however, some storage is required to accumulate enough tonnage for carload shipments. With conveyorized handling, storage usually is in bins above track level to permit direct loading to gondolas. Batch-handling systems may deliver to bins or may stack chip containers in a trackside storage area. Costs by this method include the value of the tote bins held in temporary storage plus the value of the space occupied. Another variation is to dump chips in ground-level open bins for later transfer by overhead or yard crane to gondolas. This involves rehandling but, in some cases, may prove more economical than either of the other methods.

In shops that do not have enough chips to warrant carload shipments, an increasing number of plants are loading directly into a trailer or demountable truck body in the plant yard. This often belongs to the scrap dealer, who provides it as part of his service. It eliminates the need for plant storage facilities but also creates a situation in which the plant is dependent upon the dealer to some extent.

The best system for any given plant should be based upon a thorough analysis of individual plant conditions and needs, together with an appraisal of marketing practice. While there are no hard-and-fast rules in organizing such a system, some interesting measures have been developed for application to the particular circumstances of a given plant.

In planning the Cleveland engine plant, for example, (AM-April 14 '52, p 134), Ford engineers installed chip conveyors on every machine that produced 40 or more pounds of chips per day. In an entirely different type of plant (job-lot), Morgan Construction Co figures that chip conveyors pay off whenever installed machine capacity exceeds 50 hp (AM-Feb 4 '52, p 104). This may

SPECIAL CHIP BUCKET is designed so turnings can be dumped directly into furnace. Bucket pivots around trunnions when operator pulls lanyard

be on a single machine or on a battery of several smaller units that can be grouped for service by one conveyor.

On the question as to when it is worthwhile to accumulate scrap for shipment by carload lots, a recent symposium sponsored by the Materials Handling Institute selected 30 tons per day as the break-even point. If accumulated chips and trimmings are less than 30 tons per day, daily removal is advisable. Over this figure, storage and periodic shipment by gondola is preferable.

While figures are interesting as a basis of comparison, the solution to chip-handling problems in any plant depends upon the conditions existing in the plant. There are no tailor-made plans that can be installed and no substitutes for a thorough study of the production practices, requirements, and facilities of each shop. Only through careful analysis and planning can the most effective and profitable system be developed.

WHAT EQUIPMENT IS AVAILABLE

It is seldom that any single piece of handling equipment meets all requirements in all areas of a plant. In almost every case, the best plant-wide handling system is a combination of several basic units, each applied to the work for which it is best suited. Chip handling is no exception.

Ford's Cleveland plant, for example (AM-April 14 '52, p 134), employs both conveyors and industrial trucks, the conveyors bringing chips to area collection points and the truck-trailers hauling them to the chip house. In Detroit, DeSoto employs an entirely different type of conveyorization, together with a bucket elevator. In other areas of the plant, trucks are employed as well as sluicing. Similarly, Morgan Construction Co, a jobbing operation in Worcester, teams both conveyors and trucks in one system. Overhead handling frequently is found at the chip-processing area and also at the leading point.

In many plants, too, the transportation of chips and trimmings is part of the work performed by the regular plant handling system. At Walker-Turner in Plainfield, bar stock is moved to storage on a hoist that travels over a monorail from shipping, then transfers to an overhead traveling crane that serves the storage rack and several automatics across the aisle. After extraction of oil, chips produced in this area are carried to the dock by the same overhead equipment. While this is a low-tonnage operation, simple mechanization has saved manual labor and hand trucking, and has greatly improved what formerly was a fatiguing, messy operation.

At Briggs, Detroit, the same industrial trucks that bring sheet steel to the presses also move trimmings out of the area. And, in any number of plants, shop trucks pick up chip containers located at each machine or at area points along routes normally traveled. This plan works out well in those plants where the tonnage involved does not justify a separate handling system.

Actually, complete systems designed only for chip handling normally are found only in the high-volume plants. However, considerable potential for cost reduction often exists in the small- and medium-size plant in the opportunities presented for improving methods in each of the major phases of the over-all chip-handling operation.

REMOVAL FROM THE MACHINE

The first phase is to get the chips out of the machine. Builders of machine tools are paying increasing attention to this problem. A number of automatics, for example, are equipped with conveyors to carry chips from the machine base. Others are so designed that chips fall from the cutting area to the pan for manual removal to tote pans or bins.

Should it be desirable to add a conveyor, the pan usually can be modified to direct chips and turnings to the conveyor or to a hopper in the machine base. Hoppers can be used where one conveyor serves several machines and more than one material is machined. Segregation can be accomplished by opening only hoppers of like material at any given time.

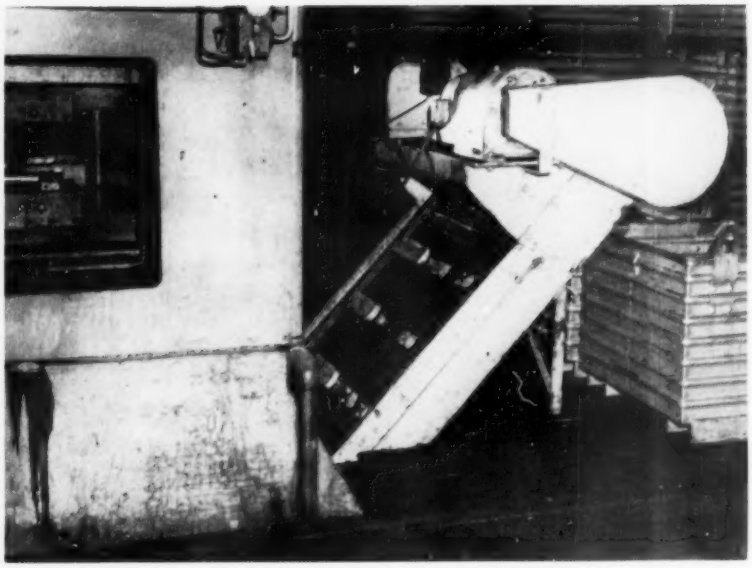
Chutes or deflector plates normally can be added to machines in which the work rotates and is held either in the vertical or the horizontal position. The same is true of presses. In this case, scrap cutters can be designed into the die to reduce the trimmings to an easily manageable size. Dies also may be built up more than usual

to provide enough slope to the plates so the trimmings slide by gravity away from the working area. Small continuous-belt and metal oscillating conveyors sometimes are built into the die to carry slugs and punchings to the chutes.

Trimmings can be chuted to conveyors at floor level behind the presses, through floor openings into conveyors or tote bins below, or to portable elevators in a pit behind the press. Scrap strip also may be handled manually either to a conveyor or tote bin.

Thus far, there is little evidence of the application of mechanized methods of chip removal to planers and similar machines in which the work moves past the tool. Customary practice is to clean up the table and surrounding area by hand. In many plants, chips are simply shoveled into a container near the machine. In some, however, chips are swept through a floor grating and drop into a tote bin. Later, the bin is removed by crane or hoist for movement to processing. This method frees the floor area of chip containers, but requires a pit and overhead equipment.

In addition to machines and presses already mentioned, automatic chip removal has been applied to broaches, grinders, transfer machines of many kinds, and special setups such as multiple drilling and tapping equipment with indexing worktables, wire-drawing units, and so on. In some cases, the design of the base casting has been modified to accommodate a particular type of conveyor specified by the user.



PRESS PRODUCT AND TRIMMINGS ride a single elevating conveyor to separate tote boxes. Divider out of sight under drive mechanism separates them. Conveyor starts from bottom of pit to work with dies that eject both work and scrap downward

Grinders frequently require a cutting fluid with a high degree of clarification, thus necessitating filtration to remove grinding chips or sludge. Often, filtration is performed for a group of machines with the coolant carrying the sludge out of the machine through trenches to the filtering unit. Machines require no sump and have no problem of chip removal.

The same is true of other machine tools for which filtration or some other method of clarification is employed. Chips wash directly out of the machine into some form of conveyor or sluice. These systems, whether individual or for a group of machines, eliminate the need for machine shut-down to remove chips or clean the sump.

As many of the conveyors for automatic removal of chips from the machine or press are of the same type as those used to carry chips to the processing area, they will be discussed later in the general section on conveyors.

industrial-truck systems

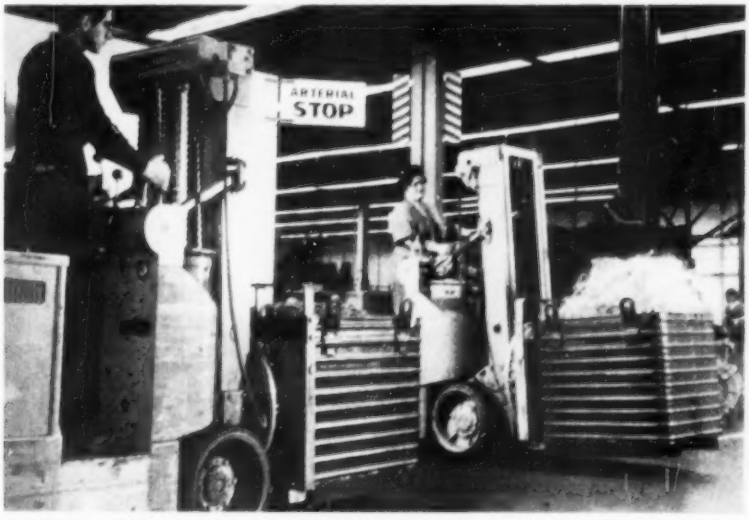
In general-machining departments and job-shop operations, there usually is very little uniformity as to the size and shape of machines, the point at which chips can be removed, and the height of the chip discharge above the floor. Under these conditions, conveyorized handling of chips to the processing area is difficult. Oftentimes, too, the layout is not adaptable to conveyorization. Truck handling, with its complete flexibility of movement over all plant aisles in all areas, is well suited to this type of operation.

Even in those areas where conveyorization can be accomplished without difficulty, truck handling may prove more economical. It may be possible for the standard plant trucking system to carry chip bins as a regular assignment without the need of additional trucks. In servicing a department, for example, trucks bringing in raw material may carry chips or scrap on the return trip. Where the processing area is some distance from machining, the economy of trailer trains also must be considered.

Either fork or platform trucks can be employed in conjunction with a member of different types of chip containers. If the truck is standard and the tote bin is conventional, some method of dumping must be devised at the proc-

ROTATING CARRIAGE on 4000-lb battery-powered fork truck dumps chips from roll-over tote bin into waiting gondola

DEMOUNTABLE TRUCK BODY RECEIVES CHIPS from dumping hopper. Hoppers are located throughout machining area. When full, demountable body is picked up by scrap dealer



ROLL-OVER TOTE BIN has rectangular steel pockets into which truck forks are inserted. Lugs on bin also permit hooking for overhead handling

CHIP-CARRYING DRUM has swivel-mounted ears pivoted in trunnions on forks of truck. Operator dumps load by upending the drum manually

essing area. Often, a hoist is rigged for this purpose.

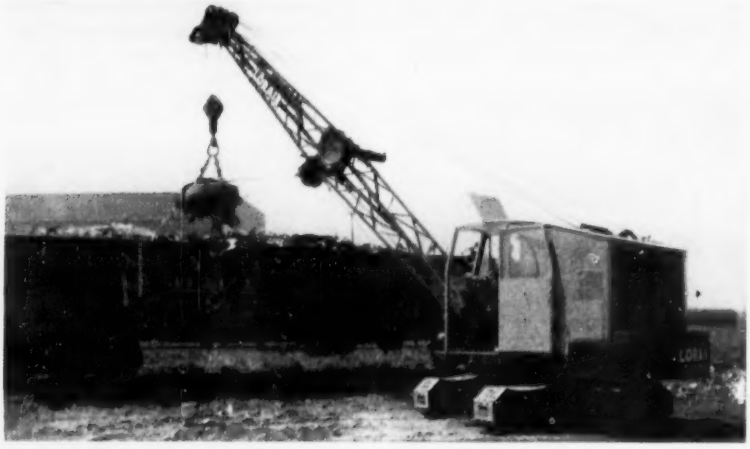
Somewhat more expensive than conventional tote bins, but eliminating the need for auxiliary equipment, are self-dumping hoppers. They are particularly convenient for those plants that ship by trailer or demountable truck bodies. Normally, these units are left in the plant yard unattended. With self-dumping hoppers, the truck operator transfers chips directly to the waiting trailer or truck body without the need for assistance and with little delay.

Similar self-dumping features can be obtained from truck attachments if the amount of chip handling justifies the expense. Rotating forks, in conjunction with roll-over bins, permit dumping directly into crushers, gondolas, trailers, demountable truck bodies, or storage bins. The operation is fast, sure, and can be controlled readily by the truck driver alone.

Drop-bottom bins, together wth the proper attachment, can be used for the same purpose. However, where chips are stringy and likely to ball, there is less danger of fouling with top-dumping hoppers. In addition to standard containers, a number of special dollies and barrels have been devised in various plants to suit their needs.

Containers normally are steel. Their size is in relation to the

SECTIONAL STEEL TOTE BINS can be built up to desired capacity. First section is supported on steel skid. Next section nests in first and so on



YARD HANDLING is done with tractor crane and electromagnet. If chips and trimmings are magnetic, this method will load scrap railroad car from yard pile

DROP-BOTTOM TOTE BIN permits dumping chips without need for attachment on truck. Method works well with free-flowing chips

amount of chips produced per unit of time and to the frequency of collection. When chips are crushed, container size should be close to the capacity of the crusher. The same is true of oil equipment.

CRANES, HOISTS, and MONORAILS

Cranes in manufacturing areas normally are involved in chip-handling only in so far as this function can be fitted into the general handling service that they provide to production. In some plants, however, gantry and yard cranes are assigned the job of transferring scrap from open ground-level bins to waiting trucks or gondolas. Magnets frequently are used for ferrous scrap.

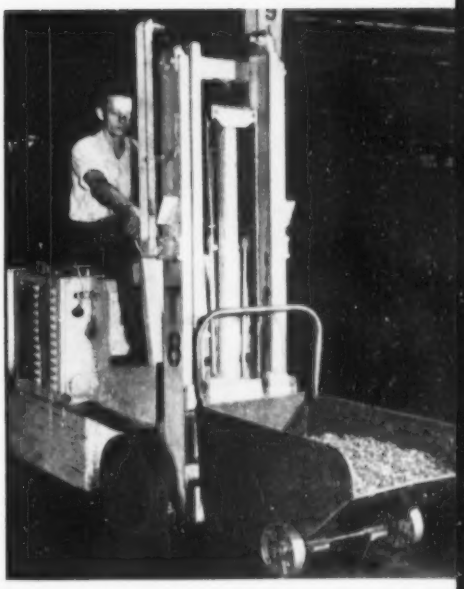
Hoists frequently are found in the chip-processing area for handling chip buckets to and from the chip wringer and for dumping chip trucks and containers onto the crusher chip deck.

Roll-over devices capable of turning an entire chip trailer far enough over to empty its contents to a conveyor or hopper also are used in some plants.

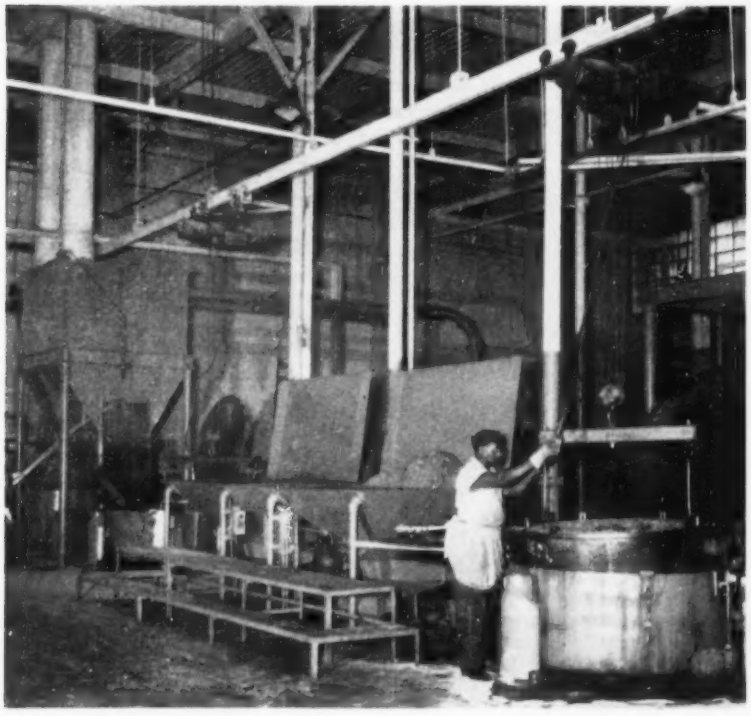
Monorails as applied for hoists are often found in chip-handling, and, in some places, the standard monorail system for incoming material also handles chips on the return trip. However, complete systems set up for the purpose of chip handling have been developed and installed.

The possibilities in automatic operation and cycling with equipment of this kind are illustrated by an installation made during the war in a midwestern plant. Here, two monorail carriers operating in a tunnel below the manufacturing floor carried one carload of ferrous chips and shavings daily (12-hr shift) to bins near the railroad. Carriers moved back and forth from tunnel to bin automatically. Moving away from the bin, a load-carrying magnet was "off". In the opposite direction, the magnet was "on" and picked up scrap chuted into the tunnel from the floor above. At the bin, the magnet automatically shut off to drop the load. On 70 ft of track before reaching the bin, carriers traveled a 13% grade.

TRAILER TRAINS can be used to move chips to disposal areas when long hauls are required. Truck shown doubles as tractor for hauling and lifting machine for dumping



WHEELED CARTS can be trundled manually or picked up by fork truck for dumping. Fork slips into yoke under back end of cart. Trunnion arms on truck lift cart, then tilt it forward at unloading point



HOISTS FIND WIDE APPLICATION in chip-processing area for handling centrifuge baskets. Dumping of chip carts or boxes also is by hoist in many plants

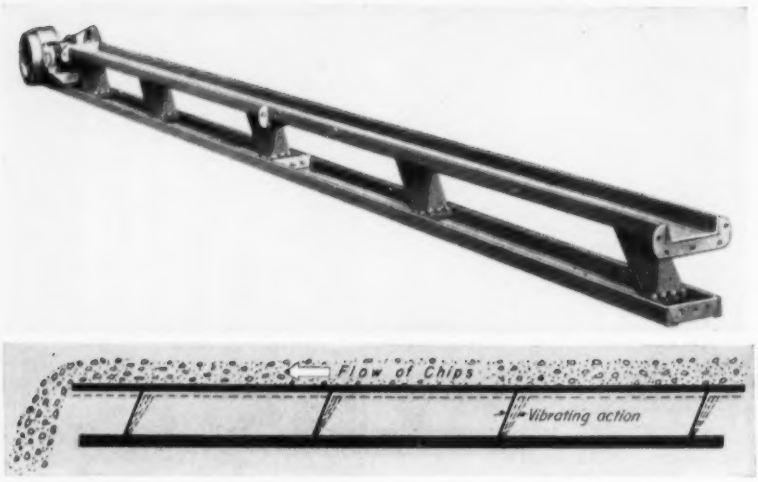
ELECTROMAGNET attached to fork truck does scrap-moving chores in yard on smaller basis than crane, with resulting economy. Useful for steel, iron, and magnetic alloys

conveyorized handling

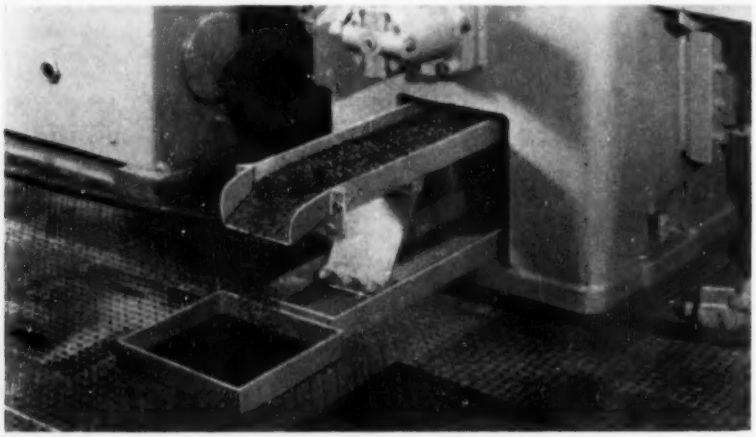
A recent conference of the Materials Handling Institute brought out the fact that there are more than 40 different types of conveyors that can be employed for chip handling. Most popular among these are: oscillating; apron; drag-chain; flight; en-masse; bucket-elevator; portable-belt; screw; and pneumatic.

OSCILLATING CONVEYORS

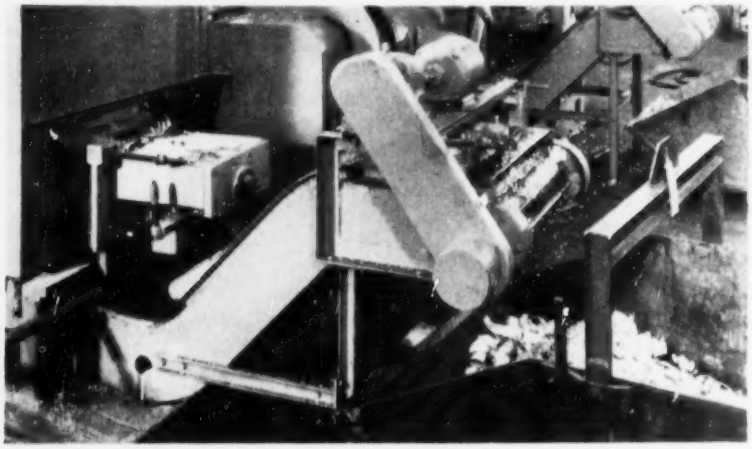
One of the simplest general-purpose units, and one that can be obtained in standard stock sizes, is the oscillating conveyor. Essentially, this consists of a one-piece metal trough of rectangular cross-section mounted on flexible supports. An eccentric drive, which can be at either end, provides an upward and forward oscillating motion that moves chips in a uniform continuous flow.



OSCILLATING CONVEYOR consists of steel trough flexibly-mounted. Eccentric drive imparts forward and upward motion that moves chips continuously along trough. Above type is popular for chip handling but other designs based on same principle also are used. Heavier units are available where service requirements warrant



HORIZONTAL REMOVAL OF CHIPS FROM MACHINE BASE can be performed with oscillating conveyor. Chips drop through opening to second conveyor below floor level



ELEVATION OF CHIPS from base of machine to convenient level for loading into chip bucket can be accomplished with apron conveyor. Unit shown is piano-hinge type. Coolant draining from chips flows to foot of conveyor and on back to sump of automatic lathe

A wide range of capacities can be obtained simply by picking the right combination of width and depth of trough and by installing a drive of proper horsepower. Generally, widths run in steps from 8 to 24 in. and depths from 2 to 4 in. Chip flow can vary from 20 to 50 fpm, although the average material travel upon which conveyor selection normally is based is 30 fpm.

Compact and requiring little clearance, the oscillating conveyor can be installed in machine beds or congested areas in which the opening is only slightly larger than the trough width. It also is adaptable to conveying over long distances and can be installed as a mainline unit for moving chips to a central point. Wet as well as dry chips can be handled and, by simply providing a trough of sufficient capacity, coolant can be returned to a central system through the conveyor trough.

Conveying is done in a straight line but the direction of movement can be changed by transferring to a second unit. This requires less drop than normally is required when transferring from a belt or apron conveyor. One trough may be as little as 1 in. above the other. Movement can be horizontal or on a downward slope but, for all practical purposes, oscillating conveyors will not move materials up an incline. By installing separators, more than one kind of chip can be conveyed simultaneously on the same unit. Gates also can be employed to discharge at intermediate points.

Having few moving parts, the oscillating conveyor requires little maintenance. Only the drive requires lubrication. While some units are designed to suit, the majority of chip-handling installations can be made from stock sections. In general, oscillating conveyors can be mounted on concrete floors without difficulty. Because of the oscillation, however, care must be exercised in upper-floor installations.

APRON CONVEYORS

As their construction features permit sharp bends around a horizontal axis, apron conveyors can

be designed to carry materials up inclines as well as on the level. They also are excellent for stringy turnings which are likely to ball and bundle and which are difficult to handle on any other conveyor. In one form or another, they are employed for removing chips from machine bases, for elevating chips from one level to another, and for long horizontal runs from machines to central collections or processing points.

Basically, an apron conveyor consists of endless chains to which overlapping or interlocking plates or shapes are attached. These shapes (called pans) form a continuous moving bed upon which the chips or trimmings are conveyed. Within this general definition are a number of variations in the design of pans, drives, chain, and so on.

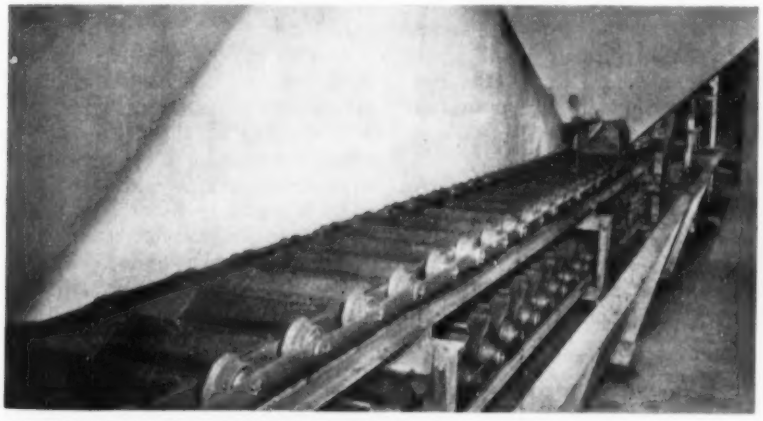
Pans on some conveyors are actually shallow open-top containers. Others are flat plates, which may or may not have a small vertical cleat welded across their width at regular intervals along the length of the conveyor. Normally, cleats are required only if chips must be moved up on incline at some point in the conveyor run. Pad ends are employed with the flat-plate type to prevent spillage. Pan perforations or screen bottoms permit drainage of coolant or cutting oil.

Both double-beaded and hinged pans are commonly used. As these provide a continuous surface without gaps, they minimize the danger of chips becoming caught between pan joints. In the hinged construction, pans have formed loops at each end so they can be assembled in a horizontal row by passing a steel rod, or hinge pin, through the loops. Pins are joined to the chain at each end.

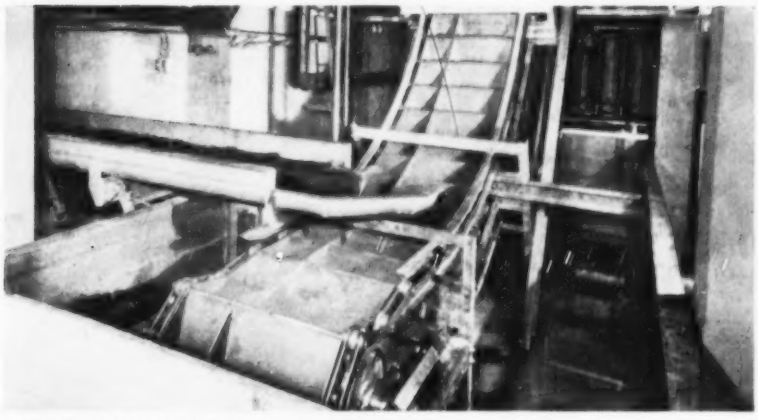
For most chip-handling work, light chain is satisfactory. Essentially, selection depends upon the strength required. This, in turn, is a function of length and the weight of the material conveyed.

Pans are designed for chain pitches from 2½ to 9 in., with the 4- and 6-in. pitches the more common. Chain speed and apron conveyors ranges anywhere from 15 fpm to as high as 100 fpm, but for chip handling around 50 fpm is considered good.

As a safety feature, installations usually are designed to shut down automatically when overload occurs. This may be accomplished mechanically through an overload release on the clutch or electrically through switches designed to shut

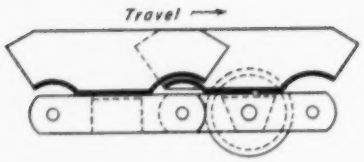


APRON CONVEYOR CARRIES TURNINGS AND BORINGS up inclines as well as on the level. Pans can be of a number of different types. Coolant drips to trough

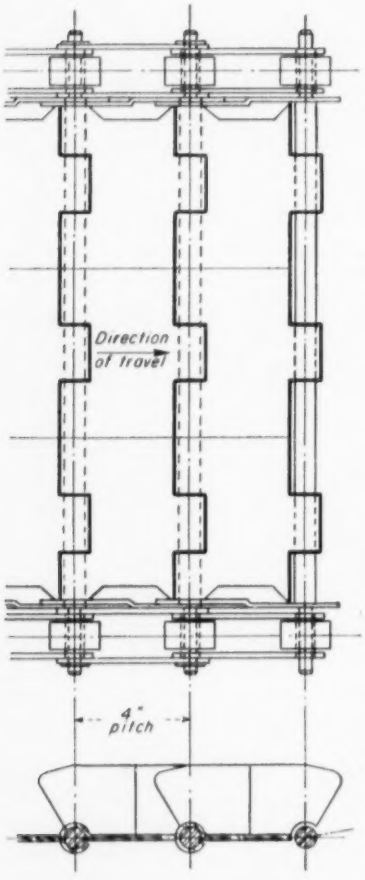


DIVIDED-PAN APRON CARRIES TWO DIFERENT TYPES OF CHIPS simultaneously. Apron is fed by divided trough oscillating conveyor at left

PARALLEL INSTALLATION OF APRON CONVEYOR eliminates manual removal of brass chips from turret lathe. Bars welded at regular intervals prevent chips from falling back on steep incline



DOUBLE-BEADED PAN OVERLAPS AT EACH END to prevent material from working into apron joints



PIANO-HINGE APRON is assembled with heavy pin through loops and attached to chain on each side. Pan ends form continuous side wall on conveying surface at all times

off the power if chain tension increases beyond a predetermined limit. Shields normally are provided to reduce the danger of chips falling into the chain.

As chips are carried on the conveyor surface, the danger of wear from chip abrasion is reduced to a minimum. The weight of the conveyor apron and lead, however, is carried by the chain and its supporting track. Minimizing wear at these points requires proper design, good lubrication, and adequate maintenance.

Wear increases as speed rises. Pins and rollers must be well lubricated for satisfactory performance. Manual oiling, grease cups, or automatic oil-mist systems are employed.

When used for removing chips from machine bases, the conveyor runs horizontally until clear of the machine, then rises on an incline as steep as 30° for subsequent discharge to another conveyor or tote box. The steep angle possible permits removal of scrap at a convenient height in minimum floor space.

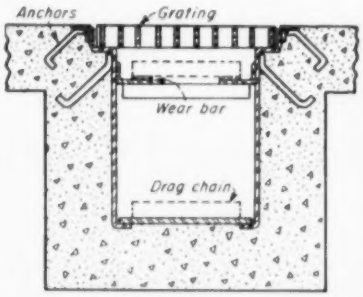
DRAG-CHAIN CONVEYORS

The drag-chain conveyor consists of one or more endless chains that move chips along a trough, trench, or other defined path. This conveyor is primarily for cast-iron or other relatively fine chips, and is not recommended for stringy turnings. It requires a minimum trench, with some additional depth being required at each end for drives and discharge. It is not necessary to allow clearance for chain maintenance as the chain can be removed from the trench for work of this kind.

Relatively simple in construction, the drag chain normally is less expensive to install than an apron of equal strength. It involves much greater friction, however, and requires more horsepower for the same load. As it also is more subject to wear, chain speed normally does not exceed 20 to 25 fpm.

Because chips slide along, the trough or trench is subject to abrasion. To provide for anticipated wear, a heavy steel plate can be used in the trench bottom. This prolongs service life and is replaceable.

A wide variety of chain can be used, some of which goes as high as 200,000 psi ultimate strength. Widths range up to 12½ in. Drag chains are capable of conveying on an upward incline although the angle is not as great as is possible on an apron conveyor. Cost goes up when inclines are involved and the wear rate also increases. Drives, methods of transfer, and safety fea-



TROUGH FOR DRAG CHAIN has replaceable steel plate at bottom. Top strand is supported on angles

DRAG-CHAIN CONVEYOR REQUIRES MINIMUM TROUGH. Chips fall through grating (removed for picture) and are moved by lower strand of chain

tures are similar to those previously described.

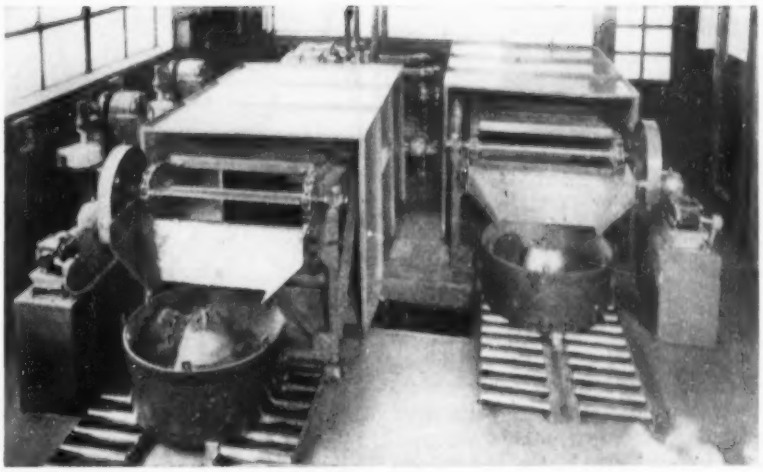
FLIGHT CONVEYORS

Similar in principle to the drag chain but permiting much heavier construction and greater widths is the flight conveyor. In this type, the chain is only the propelling medium. Flat or shaped plates (flights) attached to the chains engage the material and push it along a trough or other defined path. A wide variety of chains can be used.

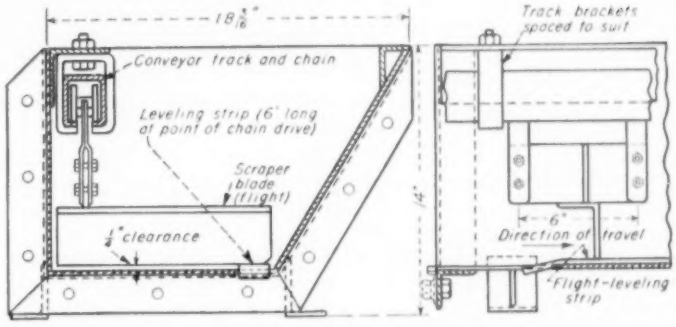
A common application is the removal of chips from settling tanks. A bar-flight conveyor moves along the bottom of the tank. Plain rectangular bars attached to the chain push chips along the tank bottom and on up an incline at the tank end. Chips discharge into containers on the floor level.

Another application is to move baled trimmings from the baler to a gondola. Steel box-like sections between chains that may be 4 to 5 ft apart push bales that weigh 1000 lb or more along a heavy steel plate. Were these bales to be carried rather than pushed, an extremely heavy and costly conveyor would be required. With the flight conveyor, bales slide on replaceable steel wear strips.

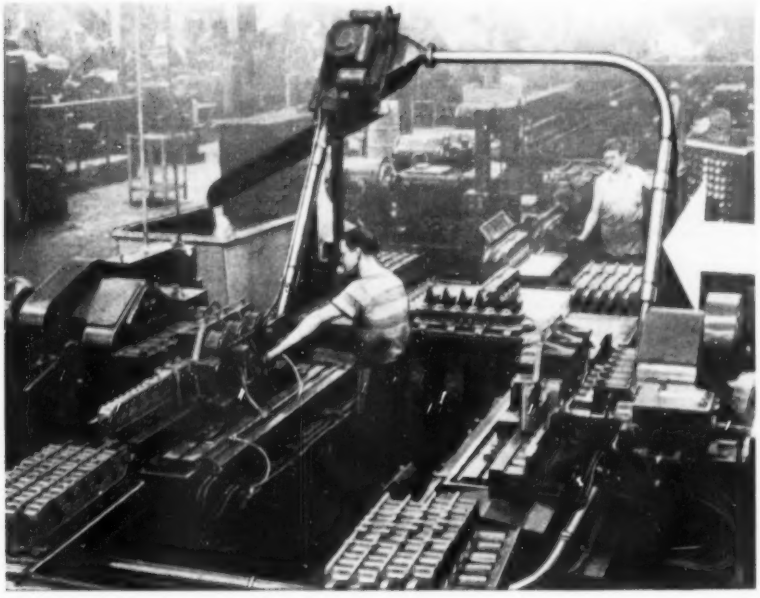
An interesting modification of the conventional flight conveyor is

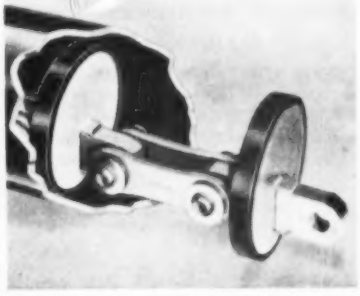


BAR FLIGHT CONVEYOR consists of bars attached to two strands of chain. Unit shown scrapes chips from coolant settling tank



MODIFIED FLIGHT CONVEYOR designed by user for wet steel chips has flight attached to single strand of trolley chain. Trough is steel and is installed above floor level





TUBULAR CONVEYOR HAS SOLID RUBBER FLIGHTS closely fitted to pipe. Flights are attached to flexible chain permitting bending in any direction

CHIP REMOVAL FROM TWO MILLING MACHINES is accomplished with single tubular conveyor that delivers cast iron to large bin on aisle. Chip removal requires no operator time

shown in an accompanying sketch. In this case, a single trolley chain is employed with flights suspended in the trough below. This installation permits a high degree of flexibility as it can turn corners in the horizontal plane as well as the vertical.

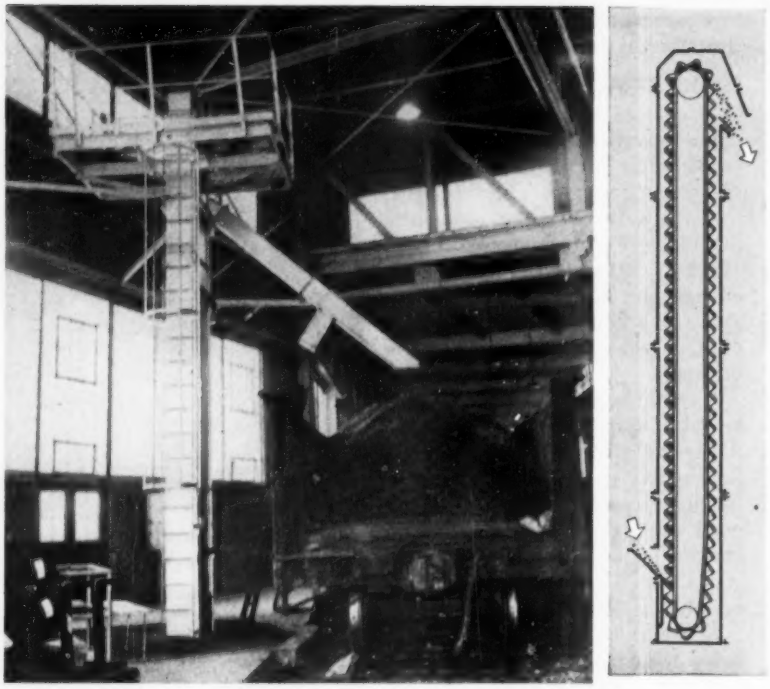
EN-MASSE CONVEYOR

The en-masse conveyor has solid flights on an endless chain that operates within a closely fitted casing. Crushed or small chips can be conveyed in a nearly continuous stream equivalent to the cross-section of the casing.

One type is referred to as a tubular conveyor. Solid circular flights of rubber (for chips) are mounted at intervals on a chain equipped with rubber washers to seal the link pins against abrasion. This assembly operates in standard pipes and moves chips at rates up to 30 fpm.

Conveyors of this type are flexible, require little space, and can make short-radius bends. They convey in any plane and at any angle. For best service, good maintenance is necessary as they are based on the pusher principle and require a good fit betwen the flights and the casing.

En-masse conveyors have been applied for chip removal from individual machines where chips are fine, as cast-iron chips from a broaching operation. They are not well-suited to stringy chips, however, because of the tendency of these chips to ball and the difficulty of feeding them successfully into the conveyor. Where the chip is suitable, the en-masse conveyor permits chip removal in minimum space and can easily rise above or move around obstacles between the machine and discharge point. The same is true of runs from crushers to storage bins. Once crushed, any type of chip can be carried.

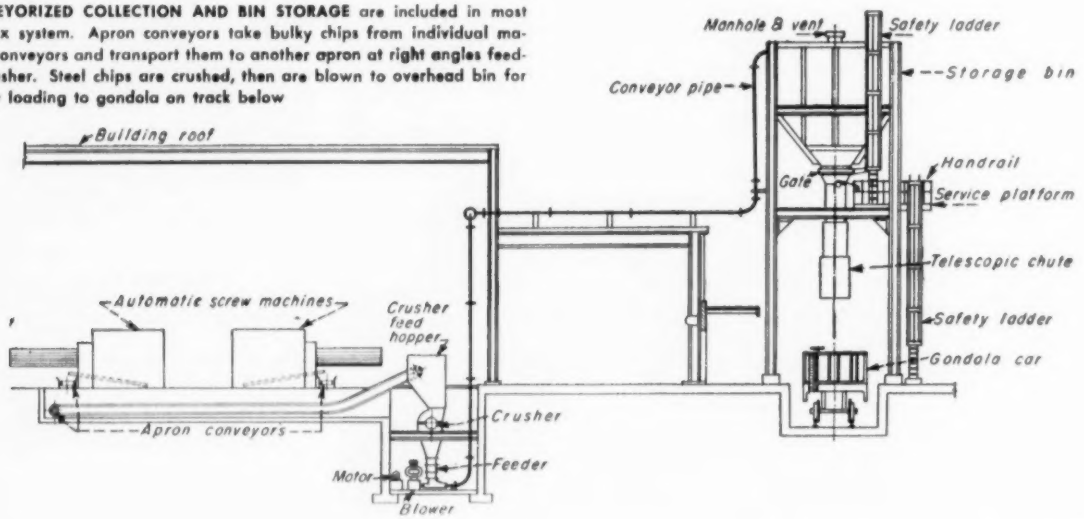


BUCKET ELEVATOR LIFTS CHIPS vertically in minimum space. Conveyor feeds elevator below floor level. Continuous bucket elevator is type normally selected for chips

BUCKET ELEVATORS

Difference in elevation can be overcome by a number of conveyors operating on an incline. Others are capable of vertical lifts but are not suitable for all types of chips. When space is at a premium, there-

CONVEYORIZED COLLECTION AND BIN STORAGE are included in most complex system. Apron conveyors take bulky chips from individual machine conveyors and transport them to another apron at right angles feeding crusher. Steel chips are crushed, then are blown to overhead bin for gravity loading to gondola on track below



fore, and a vertical rise is desirable, a bucket elevator may be indicated. In chip-handling installations, this need is most likely to be found near the shipping deck where chips are being raised to bins above the track. In some cases, elevators discharge directly into waiting gondolas.

The bucket elevator consists of buckets mounted on and carried by one or more strands of chain. Buckets pick up material in a boot at the bottom of the assembly and discharge it as they pass over the head wheel. While there are several types, the continuous bucket elevator is the one normally selected for chip handling. Customary practice is to select a speed of approximately 125 fpm and design the buckets for the load to be carried. For batch handling of chips, the skip hoist can be used in place of the bucket elevator. Wear and maintenance costs are lower.

PNEUMATIC CONVEYING

Pneumatic conveyors are widely employed for handling crushed chips from the processing area to storage bins or direct to railroad freight cars, and for the handling at any point in the system of dry cast-iron or other chips fine enough to be suitable for pneumatic conveying without crushing.

Highly flexible and easily expandable, pneumatic conveyors can be made to suit a wide variety of individual plant conditions and can be enlarged without difficulty to meet the needs of increased plant capacity. Segregation can be accomplished readily and any number of different alloys can be moved through one pipe. Balanced against these features are somewhat higher power requirements than for other methods and the fact that elbows and valves are subject to the abrading action of moving chips.

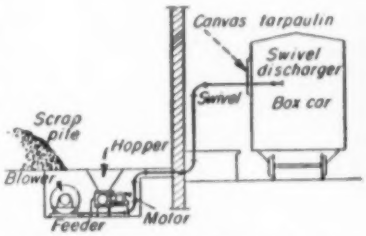
To minimize wear, elbows and a three-foot following section are made of a high-hardness alloy. Wear is no problem on straight runs because chips are not in actual contact with the tube walls.

Chips are moved within the tube by air which may be either above or below atmospheric pressure. Steel chips, for example, normally are blown. But for cast-iron, vacuum is the usual selection. As cast-iron chips are dusty, blowing would present quite a problem. With the vacuum system, after chips are delivered, the air passes through a filter which removes the dust before the air is discharged. No dust gets out of the system either at feed points or the discharge.

A recent development that shows considerable promise for miscellaneous machining areas in which it is not practical to develop line layout or any layout suitable for conventional conveying methods is a system employing pneumatic conveyors to move chips from multiple feed points throughout the area to a central processing point or directly to the railroad car. This is applicable only to dry cast-iron and other chips that can be conveyed by air without crushing.

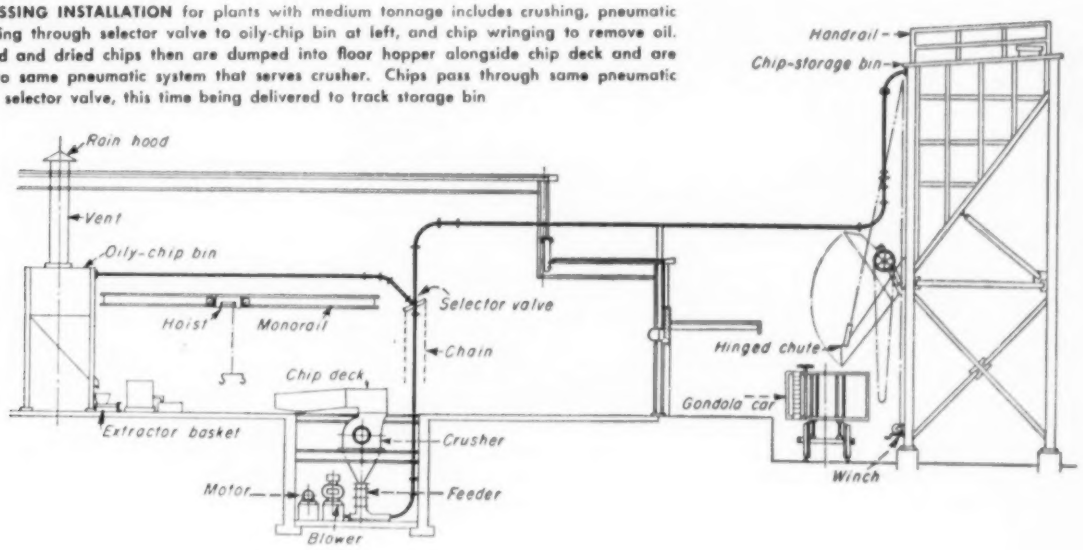
In this method, chips from individual machines are trucked to a hopper at the nearest feed point. At regular intervals, controlled by a program timer, chips feed into the system. Valving is so interlocked electrically that only one feed point can operate at a time. Chip movement from a number of feed points to a single central area thus can be accomplished automatically.

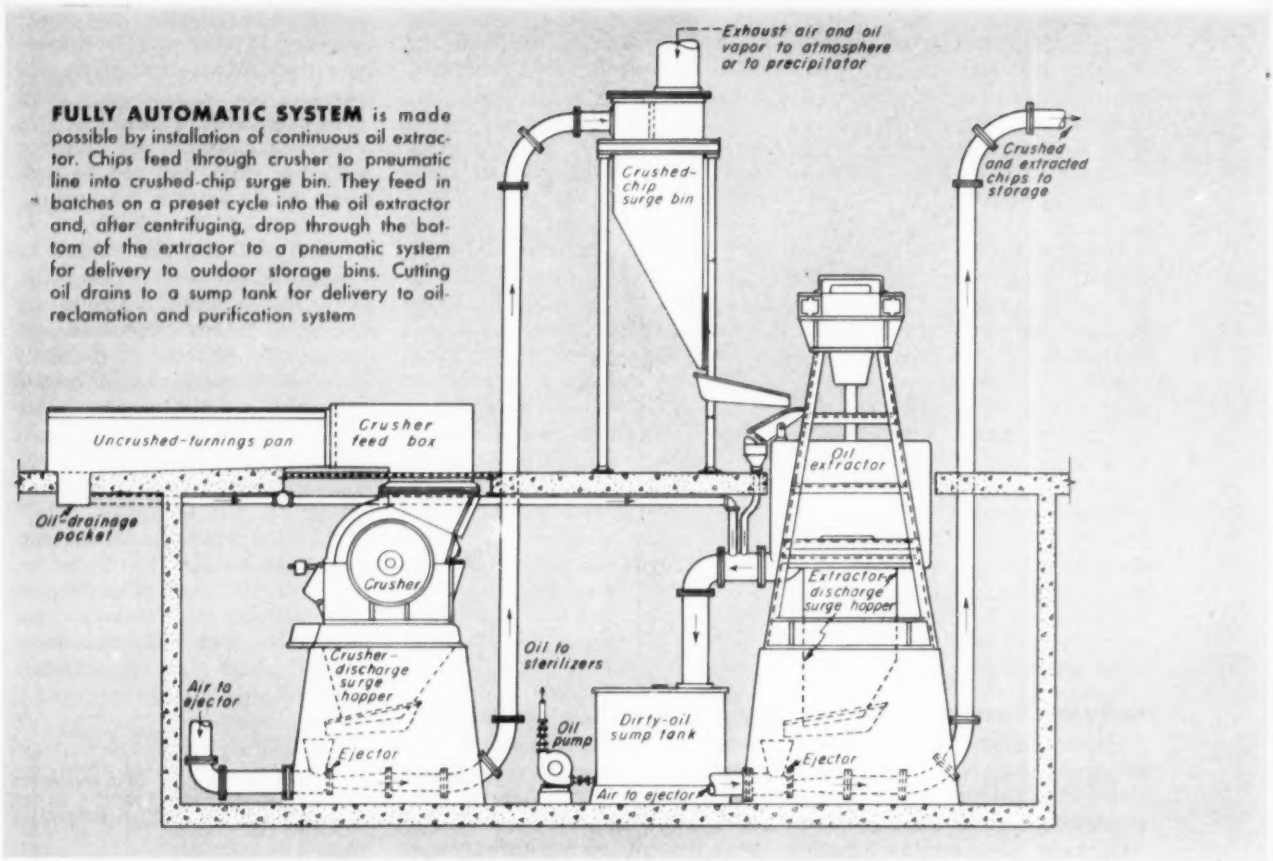
If a blower were used for this system, an air lock would be required at each feed point to prevent dust and chips from blowing into the shop area. With the vacuum system, chips can be dropped



SIMPLEST PNEUMATIC SYSTEM is to blow chips from collection area direct to waiting car on plant siding

PROCESSING INSTALLATION for plants with medium tonnage includes crushing, pneumatic conveying through selector valve to oily-chip bin at left, and chip wringing to remove oil. Crushed and dried chips then are dumped into floor hopper alongside chip deck and are fed into same pneumatic system that serves crusher. Chips pass through same pneumatic line to selector valve, this time being delivered to track storage bin





FULLY AUTOMATIC SYSTEM is made possible by installation of continuous oil extractor. Chips feed through crusher to pneumatic line into crushed-chip surge bin. They feed in batches on a preset cycle into the oil extractor and, after centrifuging, drop through the bottom of the extractor to a pneumatic system for delivery to outdoor storage bins. Cutting oil drains to a sump tank for delivery to oil-reclamation and purification system

through a single T-opening into the pipe. Only one air lock is required at the end of the line. As air locks are expensive, this holds down the over-all system cost.

Another method of feeding that eliminates the need for an air lock is the venturi nozzle. Increased air velocity at the nozzle creates a slight vacuum at the feed point. To keep horsepower requirements within reason, however, this method normally is not applied for loads greater than two ton hr. It also is limited to lines with only one feed point, as wear would be too great to permit blowing chips through the nozzle.

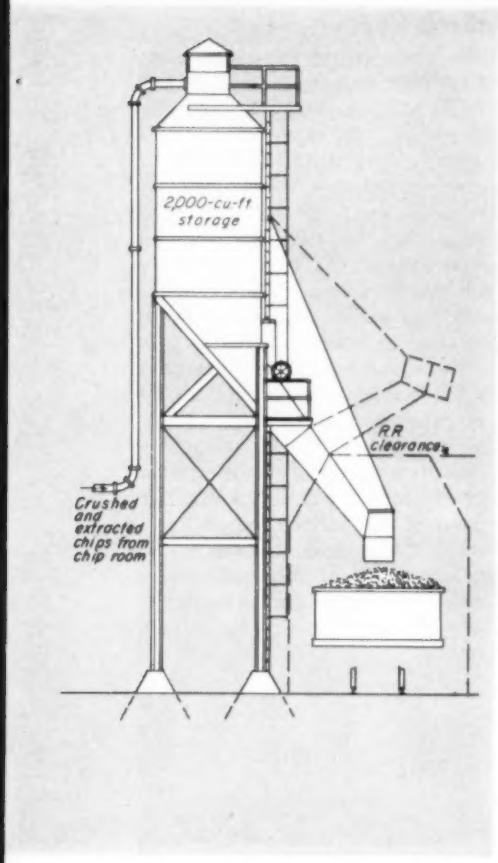
In pneumatic conveying, material is moved at constant velocity. Systems range from 1 to 25 tons per hr, handling metal turnings weighing as high as 250 lb per cu ft. Pipes range from 4 to 12 in. in dia. Power requirements depend primarily upon the weight of the material and the velocity required to keep this material in suspension. Several combinations of pneumatic conveying are commonly employed for moving chips from the processing area to storage or shipping. These are shown and explained in accompanying schematics.

Probably the simplest is blowing direct to the railroad car without crushing. This can be done only with small chips and normally is done only for chips that are shipped by box car. This includes materials of relatively high value such as brass, bronze, copper, aluminum, stainless, and other alloys.

Another system shown is one used for steel chips produced in water-soluble oil which is not of sufficient value to justify reclaiming. In this case, chips are crushed and then blown to an outside storage bin that permits gravity-loading of gondolas on the track below. By addition of extra bins and selector valves in the line, two or more different materials can be conveyed by the same basic system. No contamination occurs as the pipe blows clean after each kind of material passes through.

When cutting oil must be recovered, a third system is suggested for plants with a moderate volume of chips—say, two tons per shift and under. Chips are crushed and delivered through the selector valve to the oily-chip bin. Chips chute into the extractor basket, oil is removed, and chips are dumped into a floor hopper alongside the chip deck. Crushed and dried chips fall into a primary helical feeder (screw conveyor) that delivers them to the air lock where they enter the pneumatic conveyor again, this time with the selector valve set so the chips pass through the branch line leading to the outdoor storage bin.

With a system of this type it is not possible to crush and extract at the same time. Therefore, sufficient space must be provided to



store the uncrushed chips produced while extraction and delivery of dried chips to storage is performed.

If volume increases enough to require more crushing and extracting time than is possible with the installation as shown, an additional line can be run from the floor hopper direct to bin storage. Crushing and extracting then could be carried on simultaneously. Further, any chips that did not require extraction or crushing could be dumped directly into the floor hopper for delivery to the bin.

One of the most recent developments is the continuous system shown above, left. The major difference between this and the systems previously described is in the use of what is termed a continuous bottom-discharge extractor. This will be described in detail later, but essentially it permits dumping dried chips through the bottom of the extractor, thus eliminating the need for manual labor at any point in the entire processing system. Once fed into the crusher, chips move in a direct line to the storage bin without operator effort.

Material - handling functions shown in the diagrams just discussed can also be performed mechanically, in many instances, by proper application of the various conveyors already described. In general, the installation cost of pneumatic equipment is lower than mechanical for the longer runs, with the break-even point somewhere around 50 ft, when the run includes both horizontal and vertical conveying. Power requirements for pneumatic systems, however, are much higher. A thorough analysis should be made to develop full cost figures together with other particular conditions influencing selection in each plant.

OTHER TYPES

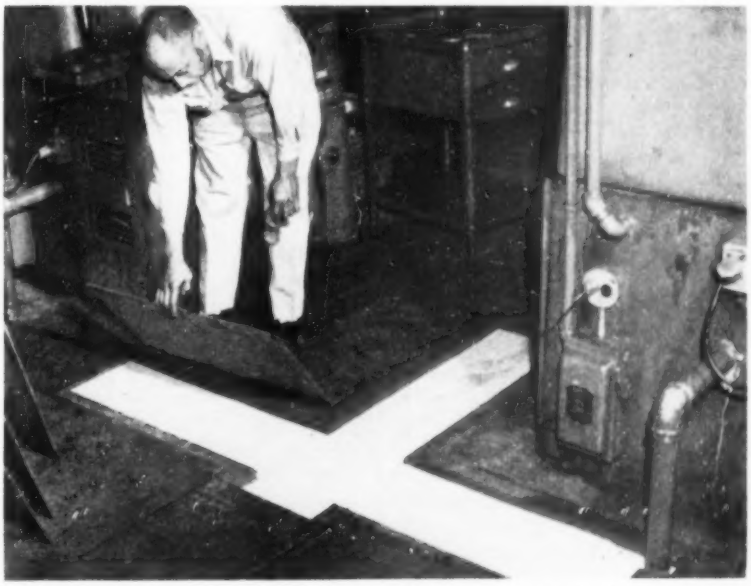
Screw conveyors find application particularly for chip removal from individual machines and as feeders for pneumatic systems. It is essential to deliver chips to pneumatic conveyors at a rate that is within the capacity of the air stream to pick up the load. Vibrating feeders also are used for the same purpose.

Belts are not recommended for use with cutting oils but are employed for handling trimmings or skeletons from presses. They carry up inclines as well as on the level. To keep small trimmings from falling off, belts can be troughed. Portables also are found in pressroom work. Often they are mounted in a pit below the press and deliver to tote bins near the plant aisle.

SLUICING THE CHIPS

Grinding sludge can be moved by sluicing from the machines to filtration points, and this has been done in many plants for some time. Increased application of this technique can be expected in the future. It requires a large amount of oil, of course, and a large number of machines must be included in the system to make it practical. It also appears generally that economical installations can be made only when new plants are being built, when the necessary trenching and tanks could be installed at minimum cost.

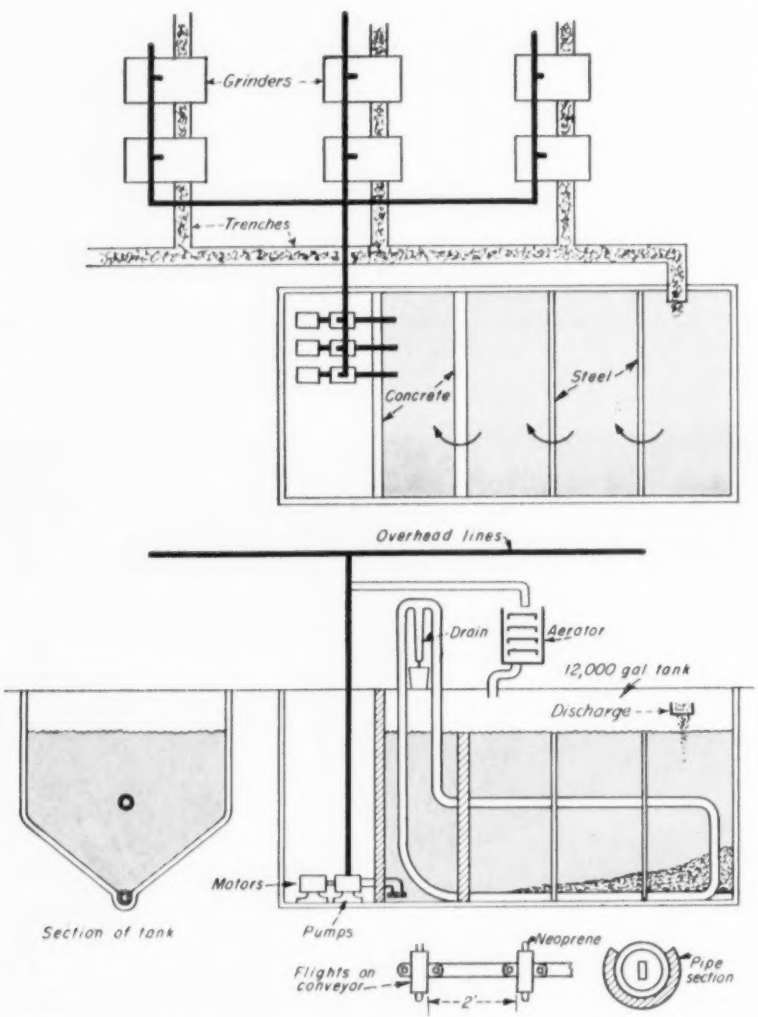
The system requires no moving parts, and therefore has low maintenance cost. Oil is handled in a central installation, and machines do not need sumps. No time is lost in cleaning the chips or sludge.



TRENCHES UNDER STEEL FLOORPLATES carry soluble coolant from grinders back to filtration setup in central system. Coolant flows to grinding wheels through overhead lines, then through regular spouts, over wheel, then to trench under each machine that ties in with trench network

Sluicing has been tried out successfully in several plants, including one in New England where an experimental installation of five automatics convinced the plant management that the idea would be a must when an envisioned plant was built. The cost of the experiment and complications of having a system separate from older chip-handling methods in the older plant, however, convinced them that the installation must be new in a new plant to be sensible.

Another example of sluicing is Standard Pressed Steel, Jenkintown, Pa., where 56 grinders in a central centerless-grinding department are served by a shop-built system. Three pumps (one of these is a reserve) circulate 500 gpm of soluble oil at 10 psi through an underground settling tank that settles out about 92% of the solids from the grinders. Clean oil is then delivered to the machines, from which it flows back through trenches to the filtration tank. An aerator takes off 20% of the oil in the system to kill bacteria. Advantages of this installation are improved wheel life, more pieces ground per dressing, better finish on the work, and clean, fresh coolant obtained with minimum labor.



CENTRAL SLUICING SYSTEM carries dirty coolant to large tank with three settling sections. First two walls are steel; last is concrete. Drag-chain conveyor passes along bottom of inverted-V section of tank, picking up sludge, and carrying it to disposal unit. Coolant is pumped from last tank section overhead back to grinders

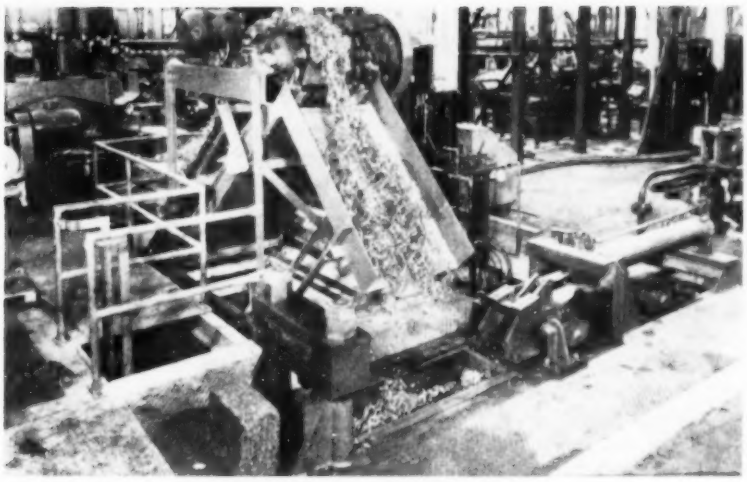
GENERAL CONSIDERATIONS

In planning conveyorized handling from machines or presses, line layout is desirable. It also must be possible to deliver chips or trimmings at sufficient height to permit installation of the conveyor. Probably the ideal situation is a new plant where conveyor trenches or facilities for installing conveyors in a basement area can be obtained with minimum cost. In this way, there is no interference with the movements of men and material on the manufacturing floor. However, floor-level installations are working successfully in a number of plants where chip-handling conveyors were added to an existing layout. Conveyorized removal and handling provide continuous, automatic disposal of chips and trimmings without the cost of handling labor and without machine downtime.

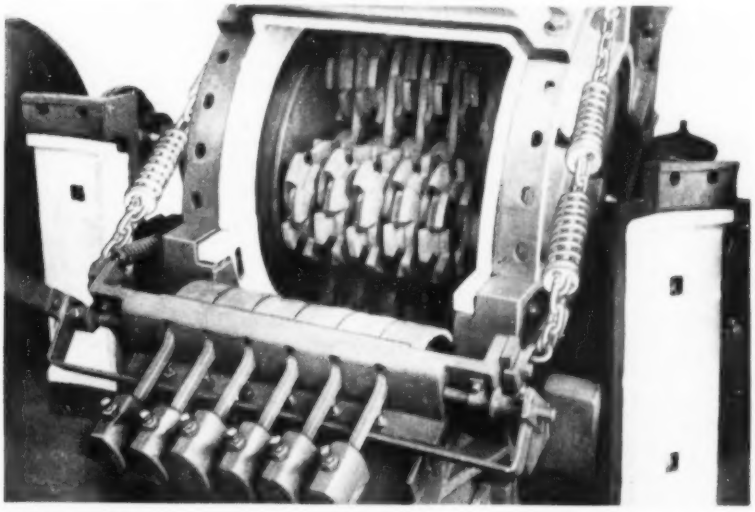
crushing, briquetting, and baling

It is difficult to set up any yardstick that can be applied widely to indicate whether chip crushing is worth the investment. In general, high-tonnage plants crush, while a great many small- and medium-tonnage plants do not.

If bin storage and/or pneumatic conveying is employed, steel chips must be crushed. Otherwise, major considerations are: Crushed scrap brings a higher return in the market. Crushing reduces stringy chips to minimum size resulting in maxi-



APRON CONVEYOR DELIVERS STRINGY ALLOY TURNINGS direct to hydraulic baler



CRUSHER WORKS as manganese-steel shredder rings are rolled around on spiders, forcing chips down to grating underneath. White areas are manganese-steel liners. Apron and bars in front release nuts and bolts that cannot be crushed

mum weight per cubic foot. Handling is easier and more efficient, and chips take up less space in storage and in gondolas. The increased density of crushed chips often make possible lower shipping charges by permitting capacity loading of gondolas. Crushing permits recovery of a higher percentage of cutting oil than is possible with uncrushed turnings.

Crushers range in capacity from 1 to 15 tons per hour. In selecting crushers, recommended practice is to provide the manufacturer with turnings that can be run through to establish a known crushing rate, as this varies with different materials. This in relation to the tons per shift to be crushed indicates the size crusher required.

Crushers are either ring or hammer types, with the former the more popular. In this design, heavy toothed rings are mounted to permit radial movement on rotating arms attached to a horizontal shaft. Centrifugal force and the weight of the rings mash chips against the grate bars. The other type is similar except that crushing is performed by hammers pivoted on the radial arms.

When crushers are below floor level, chips can be dropped into them readily but maintenance may be somewhat more difficult. Conveying chips up to the crusher, on the other hand, requires added floor space.

One problem that sometimes arises is that stringy chips are collected in trucks or containers with capacity greater than that of the the crusher. A laborious manual operation then is required to break the bundle down to a size that can be fed. Containers that hold no more than the capacities of the crusher eliminate this problem.

COMPACTING METHODS

Briquetting is employed primarily by plants with their own foundry. Turnings or borings are compressed hydraulically into cylinders 2 to 7 in. in dia and 2 to 6 in. long. These are relatively dense. Cast iron, for example, is 87% of a solid cast-iron piece. This is excellent for remelting, as dense material will not oxidize as rapidly and does not require as long a charging time as low-density scrap. Briquetting requires an expensive installation, however, and seldom pays in those plants that sell their chips.

Baling accomplishes a similar purpose with trimmings from the pressroom; some brass and aluminum chips, if they are stringy; and for a wide variety of plant waste such as paper and cardboard. Baling presses are usually located under the floor so they can be easily filled from a conveyor, hand truck, or dump truck. High hydraulic pressure closes the top and two sides of the press cavity to crash down the scrap, turning it into a compact bale that can be easily handled and shipped to the scrap dealer.

Baled press trimmings are not cleaned, though usually there is little lubricating oil present and this little bit does not interfere with the baling process. As with other scrap, best prices are obtained from pure bales of a single material.

oil extraction and

Cutting oil is fairly easily extracted from chips, and the economy in oil costs that result have convinced many plants that it is good business to reclaim sulphurized oils. However, not many companies do much more than drain water-soluble oil from their chips unless they are confronted with a definite disposal problem. Local ordnances sometimes limit disposal methods severely. In these cases, water-soluble oils are often processed and reclaimed, even though it is more expensive to do so than to throw them away.

Sulphurized oils have considerable value, particularly in view of the fact that oil on chips may run as high as 30% of the quantity of oil in the machine. There are other advantages to filtering cutting oils, including better tool life (because the oils are cleaner and have fewer of the impurities that are bound to be added to the sump), finer machined finishes (same reason, plus elimination of much of the small metal particles in the oil), and better protection of the workers from skin diseases.

Centrifuges are employed widely for separating oil from chips. The common type, in use for years, is a batch model that holds the chips in a removable basket. Chips can be drained, dumped into the basket, then the basket loaded into the centrifuge and spun. Rotation at 750 to 1100 rpm, depending upon basket diameter, for about three min takes out up to 99% of the oil on the chips. The ordinary centrifuge basket is then lifted with a hoist and dumped; then reloaded for another cycle. Cutting oil reclaimed at this point is, of course, not clean; but the chips are in good shape for selling as scrap.

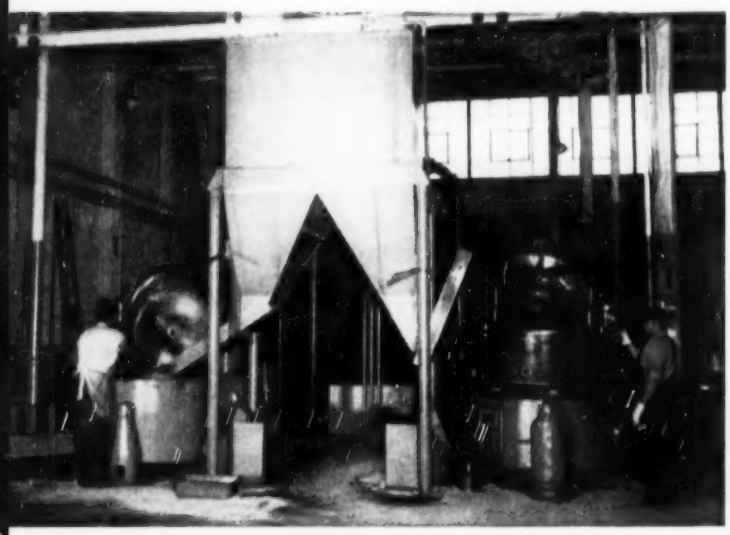
The latest development in centrifuging is the automatic bottom-discharge extractor. This is not new in basic design, but its application to chips is recent. Thus far, only four units have been put into service, in which all have been entirely satisfactory. The extractor is designed for automatic loading, cycling, and discharge. The basket is suspended on a shaft supported overhead only, so the bottom of the unit can be open. Chips are fed by a vibrating feeder onto the distributor plates of the extractor; the spindle meanwhile rotating at half speed, which throws the chip out to the sides of the basket and holds them there. After timing devices shut off the feeder, the extractor is brought up to full speed automatically for a preset centrifuging cycle. Another timer shuts off the motor and brakes the basket to a stop.

Just before the basket slows to a stop, gravity acts on the chips to make them fall into a surge hopper underneath, from which the dried chips are fed to a storage-bin conveyor. After a pretimed unloading wait, the cycle starts again, following through on the completely automatic cycle.

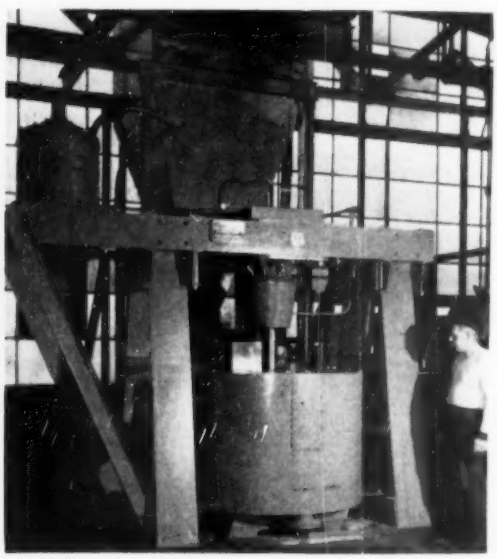
The extractor will take 10 cu ft per load or 1000 lb, whichever is the limit. Automatic timers are adjusted to give cycles as required by the kind of chips involved; normally around 12 cycles per hr can be expected.

In addition to extraction, complete oil-reclamation systems usually include settling tanks, centrifuging or filtering equipment, and sterilizers. Oil drains to a dirty-oil sump from the extractor, from the chip deck at the crusher, and from the oil-chip hopper. Preliminary screening removes large particles of chips and heavy dirt concentrations at this point.

The oil is then pumped to a



CENTRIFUGE OF CONVENTIONAL DESIGN has removal basket. From 95 to 99% of oil can be extracted by centrifuging. Chips, in this installation, feed from hopper



CONTINUOUS BOTTOM-DISCHARGE EXTRACTOR is a recent development (only four have been built and installed to date). Unit permits fully-automatic chip processing with appreciable saving in labor in large New England plant

sterilizing tank where its temperature is raised to 180-200F, which serves to kill bacteria and to lower the viscosity. The thinned oil drops some remaining particles in the tank, and is also in better condition for centrifuging, which is the next step. There is some debate as to whether or not this heating does much to reduce dermatitis, but it does lower viscosity, which aids in centrifuging, or in filtering the oil through a screen or diatomaceous earth.

Oil filtering is effective in removing dirt and small metal particles, and also for extracting and separating water. A vacuum dehydrator may be included with the filtering equipment to take out water, or the centrifuge may do this. Separate exit ports pick up the water and oil individually and discharge them from the centrifuge. Periodic bowl cleaning is necessary when a centrifuge is utilized, so there is some maintenance cost. However, most centrifuges marketed today are automatic in operation; that is, they work on a continuous cycle, the bowl rotating at constant speed. Therefore, little operator attention is necessary.

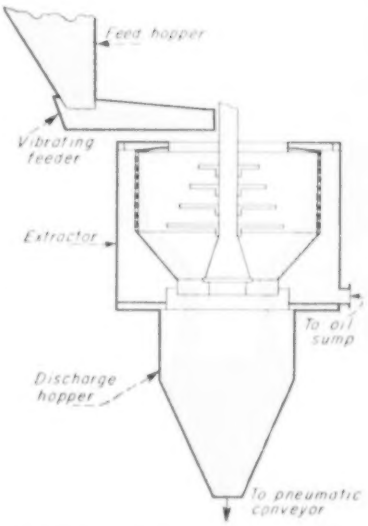
Centrifugal oil separators are of two types: vertical solid-bowl and disk-bowl. The former runs at 15,000 rpm and generates a separating force equivalent to 13,200 times the force of gravity. Solid particles are deposited against the wall of the rotor and are held there. Any water present forms a layer against the bowl wall. Purified oil, which has lower specific gravity, forms an inner layer in the bowl. Both the purified oil and any water separated are discharged continuously through the top of the bowl. Solid particles are cleaned from the bowl periodically.

The disk type operates at 6000 rpm and contains conical disks spaced at intervals approximately twice the size of the largest particle or liquid globule to be separated.

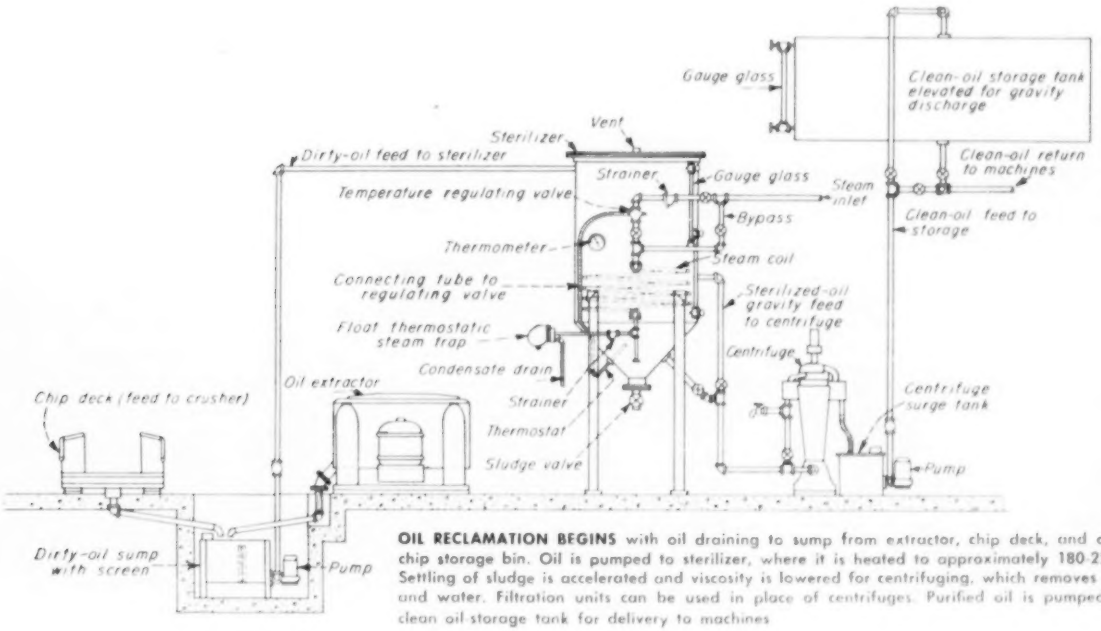
Portable centrifugal purifiers are employed as a convenient means of cleaning individual machine sumps.

In determining when purifiers pay off, the safest method is to calculate actual savings possible in each specific plant. Manufacturers claim, however, that the breakdown point on steel chips is somewhere between 2000 and 3000 lb of oily chips per week.

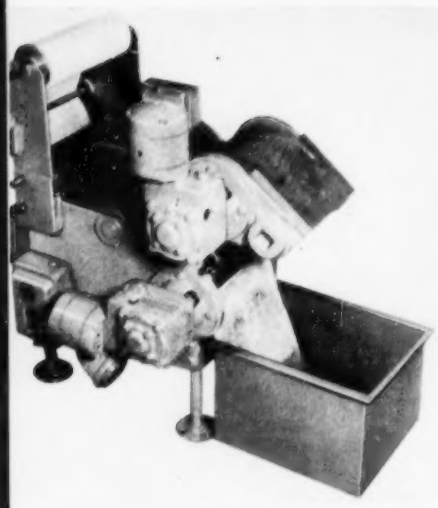
After purification, oil is pumped



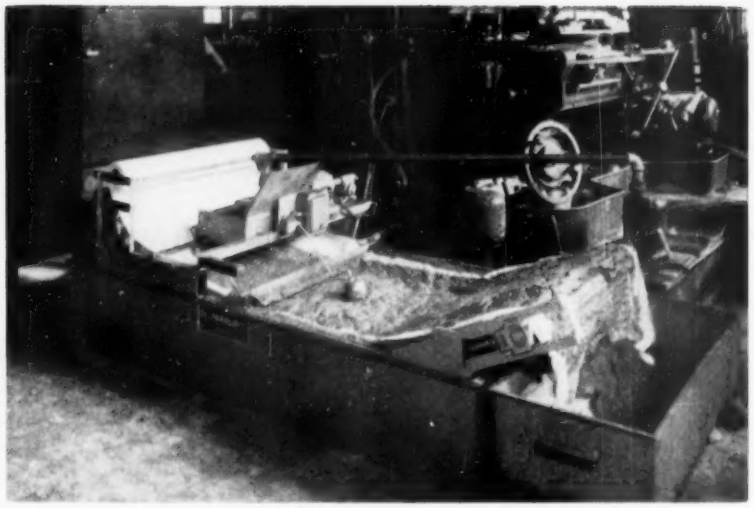
OPERATION of bottom-discharge extracter is on pre-set automatic cycle. Feeder moves pre-determined load into basket which is rotating at half speed. Baffles plus centrifugal force throw chips to basket side walls. Centrifuging cycle takes place next, after which basket is stopped and dried chips fall through open bottom of centrifuge to hopper below



OIL RECLAMATION BEGINS with oil draining to sump from extractor, chip deck, and oily-chip storage bin. Oil is pumped to sterilizer, where it is heated to approximately 180-220F. Settling of sludge is accelerated and viscosity is lowered for centrifuging, which removes dirt and water. Filtration units can be used in place of centrifuges. Purified oil is pumped to clean oil storage tank for delivery to machines



COMBINATION MAGNETIC SEPARATOR AND FILTER may be installed at single machine. Drum is magnetic; it rotates to carry ferrous sludge and oil to the cellulose belt, upon which the sludge is deposited



PAPER FILTER operates at single-machine installation. Oil is flowed onto paper, through which it passes to tank below, leaving sludge on paper. Ball in middle of tank maintains oil level

to a surge tank for delivery back to the machines where it can be used as a cutting fluid. Some enriching can be done by mixing in cutting-oil concentrates.

In plants without a chip wringer, some oil can be claimed from waste by letting the chips drain in a hopper or tank, but much more oil is obtained by centrifuging.

Equipment for performing the basic reclaiming function may be combined. For example, sterilizing units and settling tanks can be combined; and settling can be added to filtration units, particularly in smaller plants. Units of this type run from 25 to 50 gph.

Extraction and purification are not rigid processes, for each shop may have specific desires and different economic factors that determine how far and in which direction this work should be done. Many plants skip some parts of the whole, all-inclusive process. This, one plant may find it economical to crush chips, centrifuge them, and centrifuge the oil directly. Another shop might go through the full process, and a third might crush, drain, centrifuge, then heat the oil and force it through filtering material—no oil centrifuging.

FILTRATION

Cutting and lubricating oils do not wear out; they only get contaminated, dirty, and grit-filled, which makes them unfit for use in machine tools. Therefore, filtration can usually be economically practiced if the quantity of oil is sufficient, and if replacement-oil costs are high. Filtration can be done not only to remove grinding sludge and minute particles of cut chips, but to recondition the oil even when no chips are present. Maintenance on the machines is easier, too, if oil oxides are removed. Thus, portable oil filters are sometimes used in the shop, moved from machine to machine as needed, to reduce the amount of new oil that must be purchased.

But removal of foreign materials from cutting oils is the problem in chip control. For this purpose, there are several general types of filtering mediums, one of which, already covered, is the oil centrifuge. A centrifuge can remove dirt, sludge, and water from the cutting oil, but will not take out soluble contaminants like organic acids.

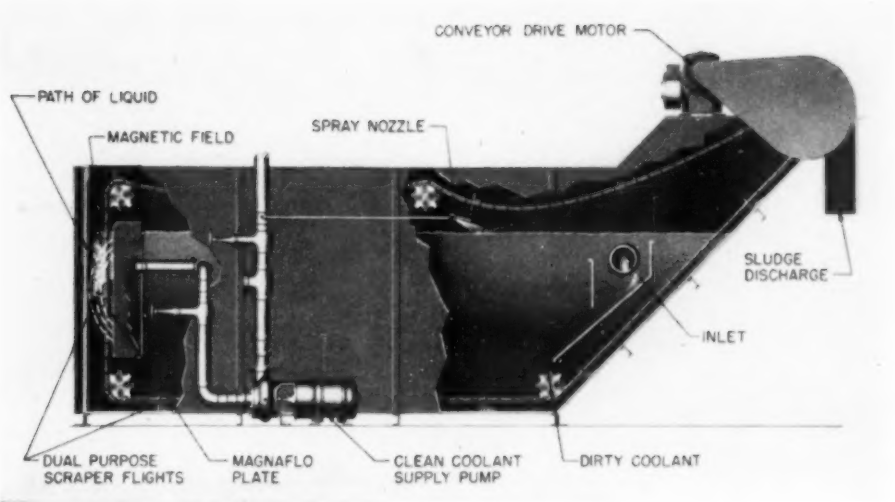
Another kind of filtering method is the flotation system, which consists of a large tank in which paddles whip up the oil as it flows continuously through the tank. The whipping produces a froth, which carries impurities with it to the surface. Skimming arms work across the surface of the oil to pick up the froth and impurities, which leaves the oil clean.

Permanent magnets are utilized in a third kind of filtering system. Naturally the material being filtered out must be a sludge of iron, steel, or alloy that is magnetic. Oil is fed to tank where a magnetic field is set up. In one type of filter a continuous disposable cloth strip is passed over a magnetic plate, and the oil is washed onto the cloth. As the magnetic particles are drawn to the plate, they are caught in the cloth, which moves slowly past the plate and into a tote box of waste can. The oil is drawn from the tank underneath or past the plate, and is clear of sludge.

A second kind of magnetic filter has a pierced plate to which the oil is directed and through which it flows into a pipe and back to the oil tank. A magnetic field is created at the surface of the plate, which halts the magnetic sludge. A flight conveyor, working past the plate and out to a disposal chute picks up the sludge and thus cleans the oil.

Another type of filter uses a vacuum under a continuous belt to pull the oil through the belt, laving impurities on the belt.

Strainer filters are the category with the most variation between types and makes. Oil can be filtered through individual cartridges at



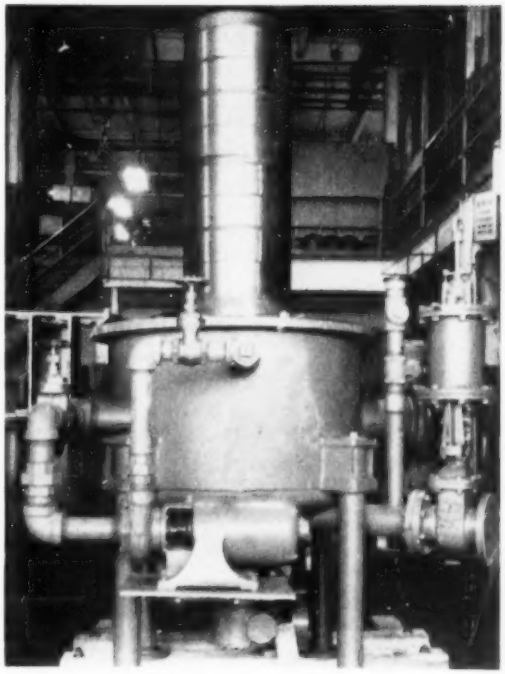
FLIGHT CONVEYOR IN MAGNETIC FILTER scrapes past magnetic plate picking off sludge attracted there by magnetic field, and carrying it up to discharge point. Cutting oil goes through holes in plate back to machining area

each machine, through paper or cloth bags, through paper disks, through diotomaceous earth or other porous material, generally in a central system; in fact, almost anything that might make a filter for any similar purpose. Usually the filtering medium must be disposable or renewable; however the expense of replacement materials is not normally high.

Once it is decided to install a filtering system, the choice must be based upon economics, local conditions, amount of oil to be cleaned, condition of the dirty oil, and many other factors that would be specific in each installation.

Generally, a central system operated continuously at or close to its capacity is most efficient and most economical. However, other conditions might well force an adoption of a less efficient system for a special purpose.

As in filtration of oils where chips are not the problem, any means that might reduce the amount of dirt and sludge in the oils being filtered would probably tend to make the filtering installation more economical — smaller, less capacity required, and not as hardworking. As far as chips are concerned, the purpose of a chip-handling system is to do something with the chips; therefore you would want to get all the chips away from the machine and into the reclamation system. However, any effort toward keeping the cutting oils clean, other than from chips, would tend to reduce the need for special filtration to recondition them.



CENTRAL SYSTEM FOR SOLUBLE OIL handles 2500 gpm, removing all particles larger than 0.0035 in. Filtering cage is stainless-steel wire, which is blown off automatically at preselected intervals

RESULTS OF FILTRATION

Cleaner oils make considerable difference in production results. For example, one installation that serves 28 grinders has cut grinding-wheel costs 47%, increased production per wheel 134%, and dropped costs of changing wheels 57%. Work quality is invariably improved by filtering the cutting oils, for scratches due to bits of grinding wheel and chips in the oil are eliminated. Wheel life is longer for the same reason.

ultimate disposal

Facilities and methods in the plant area from which chips are shipped depend primarily upon the weight of chips produced per day and upon management policy. High-tonnage producers, for example, may convey directly to gondolas. Plants that can fill a car in 48 hr can do this without incurring demurrage. Actually, as long as the plant average on cars is 48 hr there is no penalty unless a car is held more than 96 hr.

Management, however, may want bin storage facilities to avoid dependence on the availability of gondolas. For example, in one plant where bins have been provided, the gate is normally open. Chips conveyed into the bin slide straight through to the waiting gondola. Other plants store to accumulate enough for carload lots. The advantage of carload shipments must be balanced against bin cost.

For the most part, steel chips offer no problem in bin storage. Chips, of course, must be crushed to avoid balling and arching. Freezing is a potential danger in cold climates, but builders state that this seldom occurs except during protected periods of sub-zero temperatures. With pneumatic conveying, air in the system is said to be approximately 110 F when chips enter the bin. This helps to prevent freezing.

Wet cast-iron chips, however, should not be put in bin storage unless careful control is exercised over the length of time they are left in the bin. They rust rapidly and in a short time will form a solid mass that is impossible to remove. Generally, 60 hours is regarded as the maximum time they can be left in bins with safety. Wet cast iron also should not be put into pneumatic conveyors. It builds up on the pipe walls, reducing the ID and increasing velocity until the build-up finally is scoured off and hurled in lumps against the first elbow in the line.

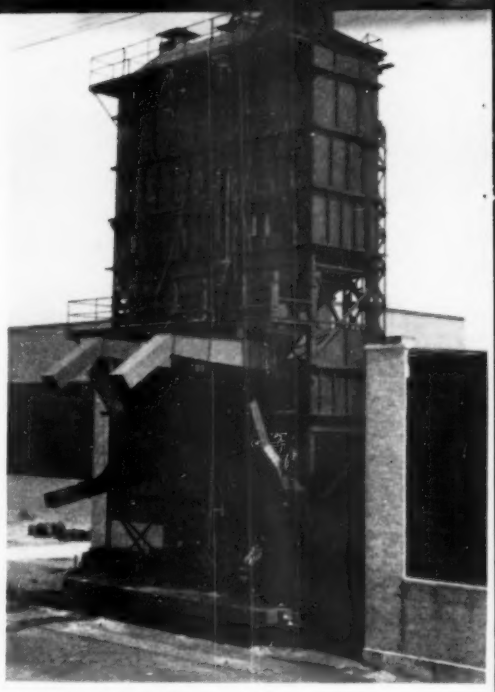
Another method of disposal is to load chips into highway trailers in the plant yard. In many areas, dealers furnish the trailers. Demountable truck bodies that can be picked up as a unit and special containers that can be dumped easily into dealer trucks also are used. These practices eliminate a loading operation in the yard and, in general, contribute toward improved plant housekeeping.

To obtain greatest return from chips, plants should segregate as much as it is economical for them to do so. There must, of course, be absolutely no mixing of ferrous and non-ferrous materials, cast-iron turnings and borings must be separate from steel, and small trimmings should be separated from long scrap strips and skeletons. Within each major class, the extent of further segregation depends, for the most part, upon the type and weight of material.

For example, when two grades are mixed, the dealer pays for the entire lot at the race of the lowest-price grade. If the percentage of the higher-price grades is very low, however, it may not be worthwhile to segregate.

Crushed, dried chips also are more valuable. Oil extraction, in most cases, pays off not only because of the increased value of the chips but also because of the value of the reclaimed oil. From the point of view of the dealer (and the ultimate user), the only marketable item is the metallic content of the scrap or chips. Oil adds weight that adds to shipping and handling charges but is of no value to the mill. The same is true of any contaminant in the chips or trimmings.

Small trimmings are marketable as is. Long trimmings, however, must be baled. Coil stock skeletons may be re-coiled and tied with two wires—(not rope). Skeletons also may be wound on a mandrel, wrapped into balls, or, with proper die design, sometimes can be cut into small trimmings as they leave the die.



OUTDOOR STORAGE BIN contains chips of three different materials at 5 upper levels and bar ends in bins below. Bar ends are carried into bin by skip hoist

We would like to acknowledge the splendid cooperation of the following companies and organizations in the preparation of this report:

Allied Steel & Conveyors, Inc
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Barber-Greene Co
Barnes Drill Co
Leon J Barrett Co
Bay City Shovels, Inc
Clark Equipment Co
Cleveland Crane & Engrg Co
Cuno Engineering Co
Conveyor Equipment Mfrs Assn
De Laval Separator Co
Elwell-Parker Electric Co
Ford Motor Co
Gemmer Mfg Co
General Electric Co
General Scrap Iron Co
Hapman Conveyors, Inc
Honan Crane Corp
Hydraulic Press Mfg Co
Industrial Filtration Co
Industrial Truck Assn
Institute of Scrap Iron & Steel
Jeffrey Mfg Co
Link-Belt Co
Logemann Brothers Co
J L Lucas & Son, Inc
Materials Handling Institute
Mayfran Engineering Co
Mercury Mfg Co
National Conveyor Co
New Britain Machine Co
Wm W Nugent & Co
Republic Steel Co
Sharples Corp
Thew Shovel Co
Towmotor Corp
Turbine Equipment Co
U S Hoffman Machinery Corp
United States Steel Co
Yale & Towne Mfg Co

ROUND TABLE

Backfirin' Discipline

"I hear Old Man Watkins is giving you a little bit of trouble, Al. Are you going to fire him, like the grapevine says?"

"Haven't decided yet, Ed. You know he was working on that rush order for the Chicago firm; then he had the ill grace to misfeed the press, which busted up the die and killed off the whole order. We were supposed to ship today by air freight, but now I suppose we won't even get any future business from that company."

"You're really in a spot, Al. The good men you want to keep seem to get into disciplinary trouble these days, and you have to get rid of them. What you have left is the jerks who don't know enough to get into a mess."

"Well, I sure hate to fire Watkins. He has a fine record, and has been here for 15 years. Actually, he was working on piecework, and he knew the job was rush. Maybe it was just carelessness; or maybe the die wasn't built right. It worked, but it might have had inherent faults that made misfeeding too easy."

"Trouble is, if you let him get away with it, the rest of the crew might get careless, too. A die like that costs plenty of money, Al."

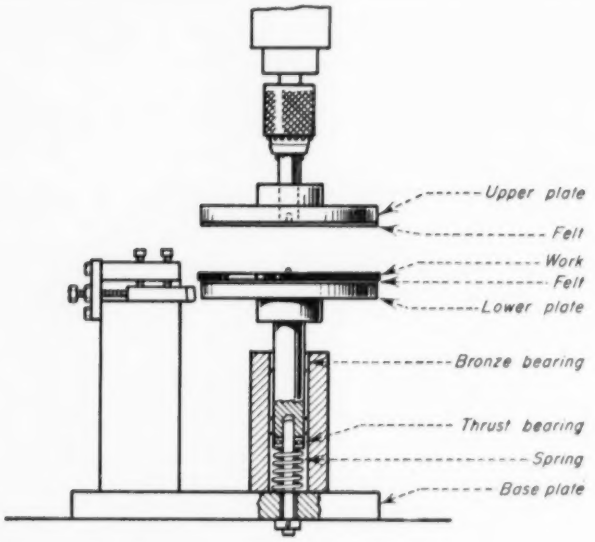
"I know, Ed. I suppose we have to do something to make it look like we're mad at him. The boss sure is mad, but he said I could use my own discretion on Watkins. Which still leaves me in the soup."

"Why don't you send him home for a few days, Al? Let him stew over his sins. That way you can keep him for his normally good work, but you still have proved to the men that there is some discipline around here."

"Maybe that's a good solution, Ed. When I started working, it would have taken my boss about 15 seconds to get me out of the front door after a boner like that, but these days you have to be careful with skilled help."

IS Al being too lenient in the case where an employee ruins part of the company's business? Or is this one of the risks any company takes? How about firing Watkins, even though he'd be hard to replace? Your comments on this problem may help others in similar plights. Discussions of earlier topics appear on later pages.

Practical Ideas



Drillpress Fixture Turns Plastic Disk to Size

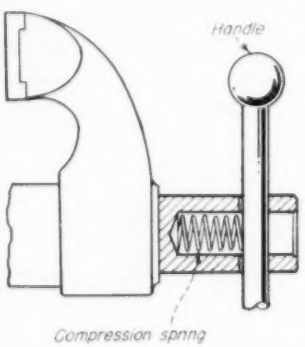
We had the problem of machining a large number of plastic disks. The outside diameter was to be turned to size and concentric with a hole already in the center of the piece. This problem was solved by use of the fixture shown.

This fixture consists of two aluminum plates faced with felt. The upper plate is mounted on a short shaft and chucked in a drillpress. The lower plate is mounted on a spring-loaded shaft with a thrust bearing between the shaft and the spring. A rod is threaded into the shaft and extends out through the bottom of the base plate. A collar is attached to the rod which acts as a stop to arrest the upward travel of the lower plate. Also attached to the base plate is a holder which is located to position the toolbit at the proper distance to machine the disk to size.

To operate the fixture, a disk is placed on the center pin of the lower plate. The rotating upper plate is forced against the disk which starts rotating with the lower plate. As the spindle is fed down, the rotating disk passes the toolbit and is turned. *H Gifford, Bronx, NY*

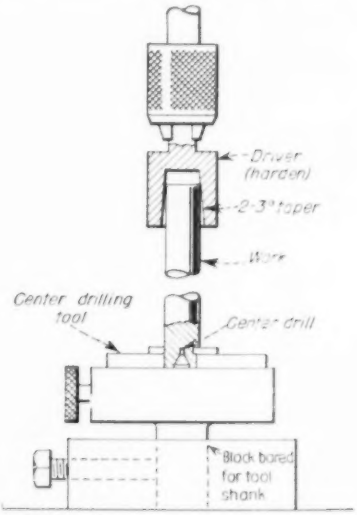
Spring in Vise-Handle Prevents Pinched Fingers

To prevent any part of the hand from being pinched by a vise handle falling, remove the handle, drill a hole slightly larger and shorter than the compression spring and replace the handle. If the hole is drilled properly, the spring will create enough tension to prevent gravity from allowing the handle to fall and pinch a finger. *Haim Murro, Boston, Mass.*



Center Drilling Shafts With Drillpress Tool

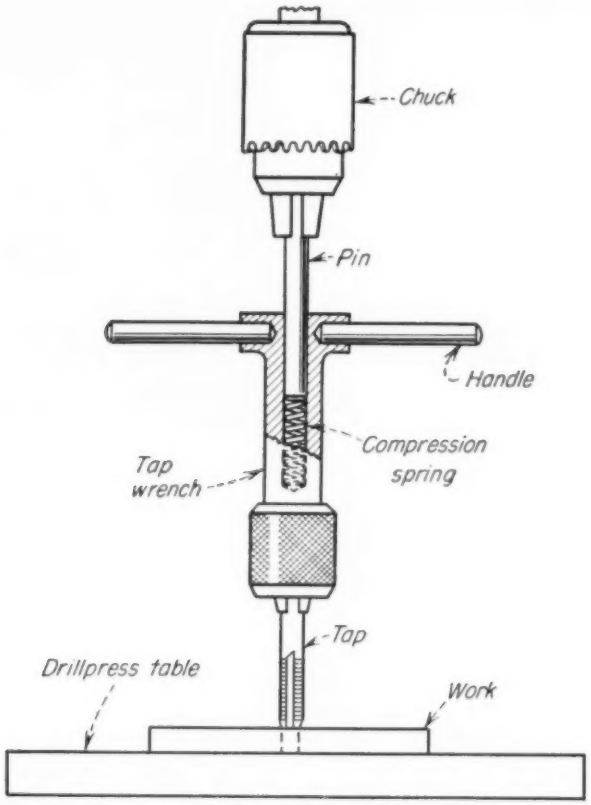
When a quantity of shafts are to be center-drilled, we have found that mounting a Warner and Swasey center-drilling tool on a drillpress can prove advantageous. Not only is the job faster but there is much less center drill breakage than when this operation is done on a turret or engine lathe.



The Warner and Swasey center-drilling tool is mounted so that the center drill is plumb with the spindle. First, however, the center drill is press-fitted into a hardened sleeve which exposes only the tip. The driver is chucked in the drillpress above the fixture with sufficient clearance for easy insertion and removal of the work from the fixture. The work is placed in the fixture and locked in the rollers. Next, the driver is lowered, which forces the work to revolve and be drilled by the center drill in the fixture.

The work may have a tendency to stick in the driver, but slight finger pressure will release it without stopping the drillpress.

We have used this method for sizes from ½-in. dia up to the capacity of the drillpress. *Owen Chapman, (No address given)*



Hand Tapping Aided By Simple Drillpress Fixture

We often have the problem of tapping one or two pieces by hand. This operation can consume a great deal of time because the tap must be aligned with the hole. The fixture shown helps to solve our problem.

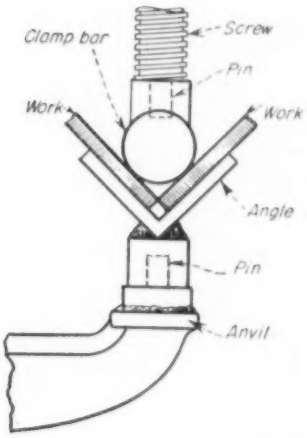
A hole is drilled and reamed in an ordinary tap wrench and a compression spring in inserted into the hole. A pin is then tightened into the drillpress chuck. The tap wrench is pushed onto the pin. The hole in the tap wrench should be just large enough to produce a running fit.

The piece to be tapped is locked below the tap wrench so that the front of the tap is resting just inside the hole. The spindle is lowered and locked, thus compressing the spring. Tapping can now proceed with little danger of the tap being out of alignment, providing everything has been set properly on the drillpress. The compressive strength of the spring helps start the tap and the pin keeps it straight. Actually, an adapter can be made which permits this device to be used on an arbor press or similar tool. *F T O'Grady, Flushing, NY*

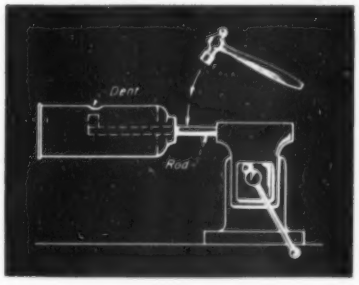
Modified C-Clamp Facilitates Welding

Weld a short piece of angle iron to the anvil. The angle iron chosen should have square inside surfaces. If this is not available, a piece may be bent square or two flat pieces of suitable size can be welded at right angles. The second method mentioned may be of advantage because a corner will result.

Remove the conventional disk on the screw and replace it with a round bar, which should be free to float on the mounting pin.

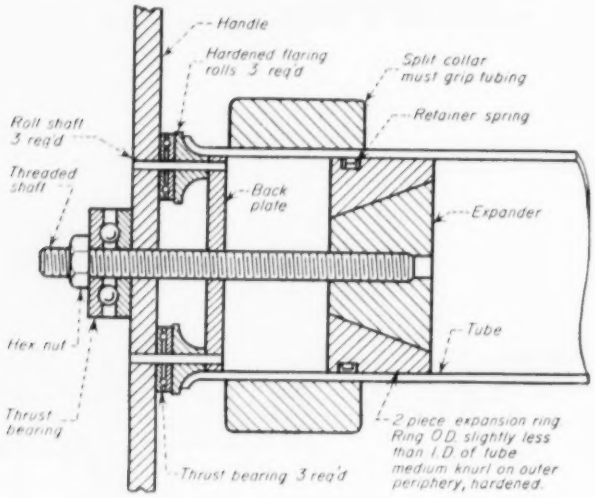


For greater versatility, a pin is welded to the anvil. The angle is then welded onto a bushing which has a hole that fits the pin. Thus, the angular piece may be rotated. If the upper and lower pins are the same diameter, the clamp bar and the angle may be reversed, thus adding the versatility of the modified clamp. *Haim Murro, Boston, Massachusetts.*



Simple Dent Remover

Shape a long piece of drillrod as shown, by bending or cutting and welding. At one end of the drillrod, machine two slight flats on opposite side to provide a better vise grip. Clamp the rod in the vise and slip the dented tube over the rod. By striking the rod with a hammer, it will vibrate in a vertical plane. The dented area is held *lightly* against the vibrating tip of the rod. This tool will remove a dent with surprising speed. *Clifford Molloy, Bronx, New York*

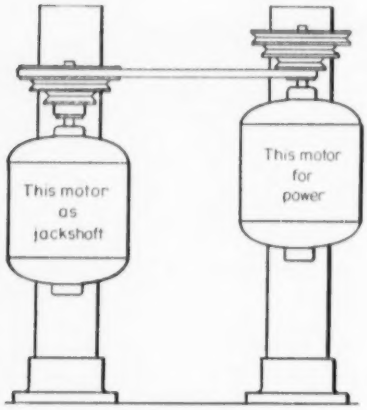


Roller Flaring Tool Helps to Prevent Explosion in Shop

When our plant was built, the plumbing contractor installed 2-in.-dia copper piping with only sweated joints. The item we manufacture is of a highly combustible nature and consequently we are forbidden to use any heat when alterations to this pipe line are necessary. The device shown has enabled us to make all the changes required by our production schedule without the necessity of removing any explosive material.

The pipe line is cut by hand with a hacksaw or pipe cutter, a flare nut is placed over the pipe, the split collar is attached to the pipe, then we insert the expander until the flaring rollers butt against the edge of the pipe. The hexagon nut is hand tightened and the split collar is locked in position. The hexagon nut is wrenched tight so that it forces the expander to grip firmly on the inside diameter of the pipe. We flare the pipe by rotating the flaring rolls and gradually tightening the hexagon nut.

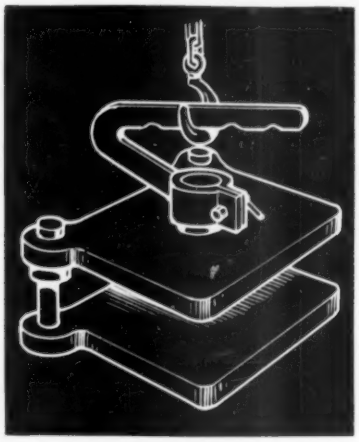
After removing the roller flaring tool, a valve, tee, or any other fitting that is necessary, can be inserted into the pipe line with a minimum disruption to producton. *R J Korstian, Pisgah Forest, NC*



Extra Fast or Slow Speed Using Second Drillpress

Occasionally it is necessary to run drillpresses faster or slower than the speeds available with the regular step pulleys. If a slow-speed attachment is not available, the setup shown can be used.

We have used this method to reduce the speed of our drillpresses for spot facing, counterboring and reaming. By simply reversing the pulleys, the speed can be greatly increased and is ideal for small hole drilling. *Owen Chapman*



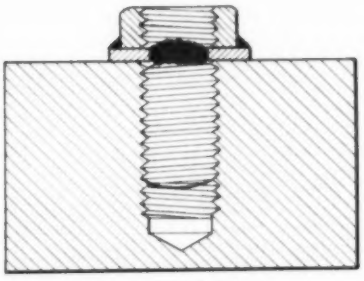
Die Lifter Speeds Set-up; Storage

A handy device to handle die sets in which the upper die has a shank which is clamped into the press ram can be built easily with scrap material. It consists of two parts: a clamping collar, to engage the protruding shank, and a length of steel strap, bent and welded to the collar as shown. This strap should have several notches cut along its lower edge, with one notch directly over the center of the clamping collar. By straight lifting, this notch permits separation of the upper and lower parts of the set. Other notches, being off center, will cause the die to hang at an angle. Thus, if the guide pins are tight in their bushings, the die set will stay assembled when lifted at those notches.

The clamp consists of a bolt and a nut, the latter having a rod handle welded to it and the former held in place by a small block screwed to the collar. *Frank M Butrick, Jr, Alma, Mich*

Multi-Purpose Drill Shank

Taper shank drills can be used in straight chucks by turning them so that the middle portion of the taper is straight. By leaving about one-quarter of the shank tapered at each end, the drill can also be used in taper spindles and sleeves. Either half of the shank provides sufficient bearing area. *Knoxville Machine Co, Knoxville, Tenn*

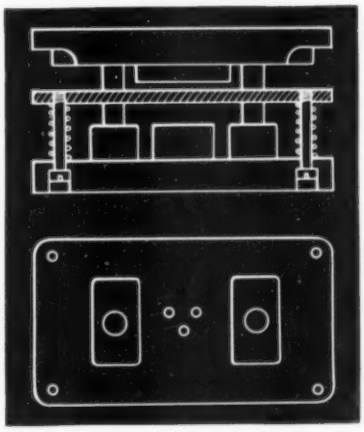


Cast iron or steel

Stud Removal Aided By Welding

Removal of a broken stud often is a very irritating maintenance problem. The method described will eliminate this problem.

Coat the area around the broken stud with oil. This will prevent the welding slag from clogging the threads. Then, a washer is welded to the end of the broken stud. A nut of suitable size is welded to this washer. Oil is squirted on the weld to case-harden the nut. Immerse the piece in water to help loosen the stud. Remove the stud by unscrewing it with the nut. *Treiber Douglas, Jacksonville, Ark.*



Big Stripper Best For Small Parts

Small dies give trouble too. They have their own peculiar problems, largely because of their smallness. In a large, or medium, size die, the location of clamp screws and the alignment of dowel pins is no problem as there is always plenty of space, but small dies are troublesome.

Recently, in a compound (blanking and drawing) die for making $\frac{1}{4}$-in. dia cups, we had difficulty in applying a spring-actuated stripper. Even making the die multiple, with three cups per stroke, did not provide sufficient room. We solved the problem by making a skeleton stripper-carrier which cleared everything, including the die set guide pins. The stripper bolts were attached directly to the upper half of the die set so that there was no interference at all in the die area. *Federico Strasser, Santiago, Chile*

Tapping-Head Holds Thread Cleaner Tool

A large portion of our production is in the manufacture of trophies and figures cast with a $\frac{1}{4}$-20 machine-screw for mounting. At a certain stage these are plated and lacquered.

In spite of various methods attempted to keep them clean, the threads often built up with paint or gobs of plating to the point where assembly was slowed.

A simple thread cleaner was devised using a steel holder, one end squared to match a tapping-head collet, and the other fitted with a button rethreading die held in place by a spanner nut lock. This is kept set up in the tapping-head of a drillpress where the figures can readily be inserted and held by hand while the screws are being cleaned.

Similarly, large threaded holes can be cleaned by splitting a large tap and mounting it in the adapter on the drillpress. Split the tap with a rubber wheel.

Since adopting this tool all parts are funnelled to it from the drying ovens and no further precautions against gummed threads are necessary.

The button dies are purchased and have an extremely long life. They are removed at the end of the day and put into a container of thinner which removes any lacquer deposits. *Donald Hoffman, Los Angeles, Calif*

Winner No. 173
of
$25 *In addition to regular payment*
of
March 2, 1953
is
John Galeazzi
Clifton, N J
Form Cutters

for the best PRACTICAL IDEA

An extra payment of $25 is made for the best Practical Idea in each number of *American Machinist*. To avoid bias, the selection will be made by readers, a different group each time.

PAYMENT—**$25 in addition to regular rates for the item as published, to be paid as soon as reader votes are received—usually three to four weeks after the date of the issue. The winner will also be announced in these pages as soon thereafter as practicable.**

JUDGES — **A group of 200 *American Machinist* readers is asked to select preferred articles in each issue. The group is a true cross-section of all readers, and changes entirely each time. Their votes, in addition to guiding the editors, select the best Practical Idea. If at any time their votes result in tie, $25 will be paid to each and every co-winner. Decision of the readers will be final in each case.**

REQUIREMENTS — **Only items in the Practical Ideas pages are eligible, and they must be submitted directly by the originator. Do not worrry about your shortcomings as a draftsman, photographer or author —every item will be edited in accordance with *American Machinist* standards and suitable illustrative or explanatory material added where needed. Readers will judge only the finished product — in terms of its usefulness to them.**

WHO MAY ENTER — **Anyone may enter except employees of the McGraw-Hill Publishing Co., Inc., and those of advertising agencies or departments. Suggest to your employees that they submit ideas.**

HOW TO ENTER – **Send your entry to "Practical Ideas Editor," American Machinist, 330 West 42d St., New York 36, N. Y.**

NEW EQUIPMENT

EXHIBITORS AT THE SHOW

A & A Machinery Corp 1033
Acme Pallet Co, Inc 1149
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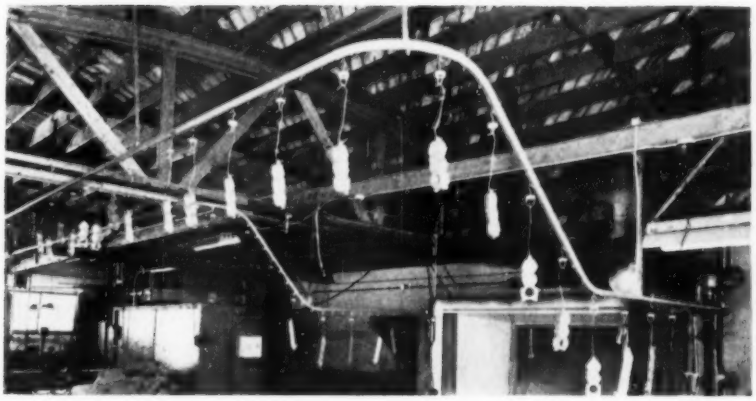
Williford Mfg Co 405
Wilshire Power Sweeper Co 504
Yale & Towne Mfg Co 248

at the MATERIALS HANDLING SHOW

equipment described here has not previously been reported in American Machinist. it will be shown, along with equipment described in earlier issues (and some not used in Metalworking) at the Fifth National Materials Handling Exposition, Convention Hall, Philadelphia, May 18 to 22, 1953



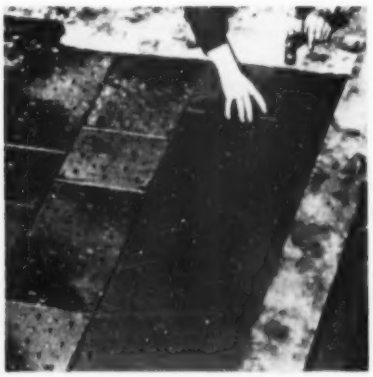
Lightweight Trolley Conveyor Runs on Track of Hollow Tubing

Overhead trolley conveyor uses track of slotted steel tubing. The conveyor chain consists of vertically mounted load-wheels joined by a bronze universal joint at 3-in. intervals to horizontal guide-wheels. All chain wheels are mounted on grease-packed ball bearings which require no further lubrication, except where temperature or atmospheric conditions are extreme.

Track tubing is $1\frac{5}{8}$x$1\frac{1}{8}$-in., for which standard 15-in. curves are available. Any combination of turns can be made up by joining horizontal-, vertical-top, and vertical-bottom curves. Chain takeup maintains uniform tension, and automatically adjusts up to 12 in. for linear expansion or contraction.

Rated capacity is 30 lb for loads at 6-in. intervals, 60 lb at 12-in. intervals. One power unit will operate a conveyor system requiring up to 400-lb pull. Systems requiring more than 400-lb pull require additional power units.

United States Spring and Bumper Co., 4951 Alcoa Ave, Los Angeles, Calif
Booth 433



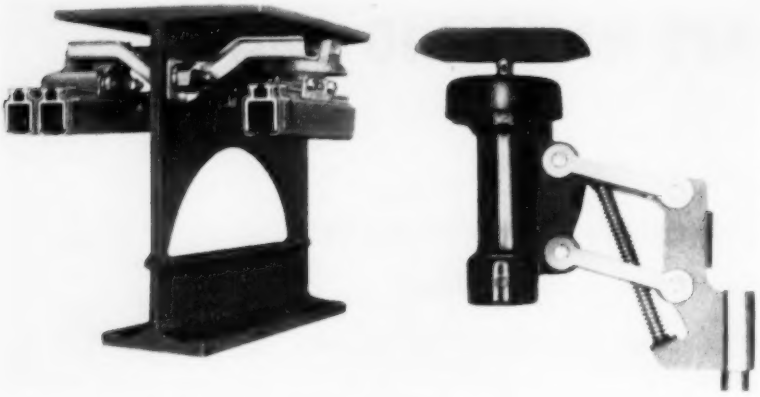
Armco Steel Flooring Combines Endurance and Safety

Safety and endurance are claimed for Stelcon steel flooring. The slotted plates are hammered lightly into wet cement. As the plate is pressed into place, trapped air escapes through the slots in the surface, resulting in an air-free bond between plates and concrete. Cleats on the bottom of the plate anchor the flooring firmly in place.

The manufacturer claims that tests to determine the relative safety of the flooring show that an oily Stelcon floor has about the same coefficient of friction as an oily smooth concrete surface.

Designed primarily for heavy-duty applications, this flooring is said to be suitable for 20-ton floor loads.

Armco Drainage and Metal Products, Inc, Middletown, Ohio
Booth 829



Insulated Crane Conductor Protects Against Shock

Insulating shield covers the Saf-Powr-Bar, a conductor for overhead cranes and runways. Protection against fire and accidental contact with the conductor bar are claimed for the device.

Sliding current collectors operate on a pantograph principle inside the inverted U-shaped conductor, and are said to have longer life than the usual collector wheels.

Cleveland Tramrail Div, The Cleveland Crane & Engineering Co, Wickliffe, Ohio **Booth 1325-A**

STABILIZED ELECTRIC CRANE suspends load from triangular support. This suspension is said to eliminate virtually all lateral and rotational sway, simplifying many crane operations — *Cleveland Tramrail Div, The Cleveland Crane & Engineering Co, Wickliffe, Ohio* **Booth 507**

Gerlinger Heavy-Duty Lift Trucks Maneuver More Easily

Shorter wheelbase — 106 in. — and power steering contribute to easier handling in congested areas with the Gerlinger lift trucks. Capacities are 4, 5, 6, and 7½ tons, and trucks are said to have a 12-ft 2-in. turning radius.

According to the manufacturer, about half the weight always rests on the front wheels, even when unloaded, giving longer tire life and easier steering.

Series S trucks have Hydrapower steering exclusively. Other models include the PH series, with 130-in. wheelbase; various tower heights and weight capacities up to 18,000 lb are available.

Gerlinger Carrier Co, Dallas, Ore **Booth 1014**

Mercury 4000-Lb Electric Sit-Down Fork Truck

Several improvements are claimed for the Yak 430 sit-down electric fork truck.

Maximum fork elevation has been increased to 130 in. Free lift was 25 in., is now 58 in. Travel speed is increased to 6.5 fpm., and the truck can right-angle stack in a 10½ ft aisle with 36-in. long loads.

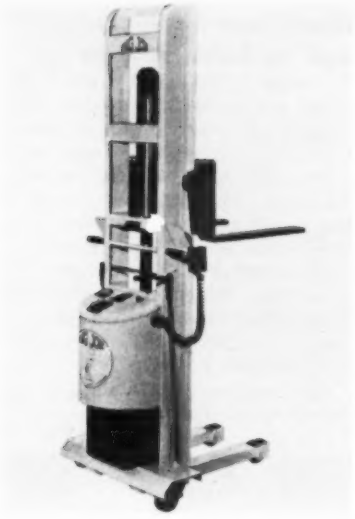
Chassis weight has been reduced to 7925 lb, and improvements in steering and control mechanisms are said to permit easier operation.

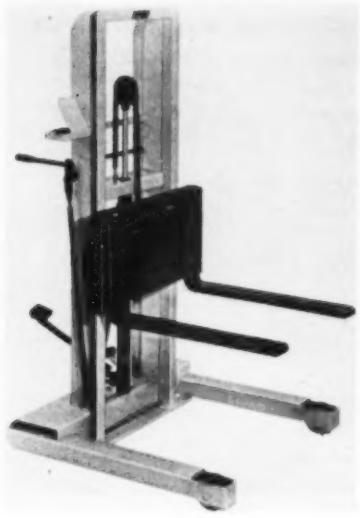
The drive assembly has been revised to include self-energized hydraulic brakes, universal-joint-connected drive motor for simple detachment, seat-actuated Timken mechanical parking brake, and detachable drive-wheel rim and tire assembly for easier tire changing.

Four-speed magnetic contactor travel control permits foot-actuated acceleration.

Prices are the same as for the stand-up model.

Mercury Manufacturing Co, 4044 S Halstead St, Chicago, Ill **Booth 1533**





Added Big Joe Models Have Straddle Base

Portable hydraulic lifts for either manual or battery operation are now furnished with several design changes. A straddle-type base can be furnished in widths up to 50 in. Adjustable forks are available in 25 to 36-in. lengths. Swivel casters are placed at rear, roller-bearing wheels in front. Dual ground-grip brakes are operated by a single hand lever. An optional remote-control unit on battery models permits the operator to ride with the load.

Big Joe Manufacturing Co, 900 W Jackson Blvd, Chicago 7, Ill

Booth 1434

CRANE TRUCK HAS 6000-LB RATED CAPACITY, 34-ft boom, designed to handle unusual maintenance problems. Boom has universal action, will operate in almost any position—*Yale and Towne Manufacturing Co, Philadelphia Div, Philadelphia 15, Pa*

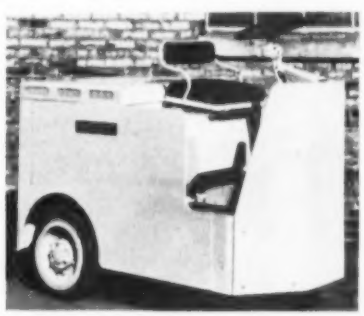
Booth 248

Bowers Develops Five-Ply Positive Plate Protection

Five layers of insulation protect all Bowers industrial truck batteries now being made. This method of protection is said to provide much longer battery life than the triple insulation formerly used. Since the heavier insulation tends to keep the acid away from the plates, a more active plate material has been developed which is said to function more efficiently with five-ply insulation than the previous plates with three-ply protection.

Bowers Battery and Spark Plug Co, Reading, Pa

Booth 1023



Mercury Electric Tractor Has 2000-Lb Pull

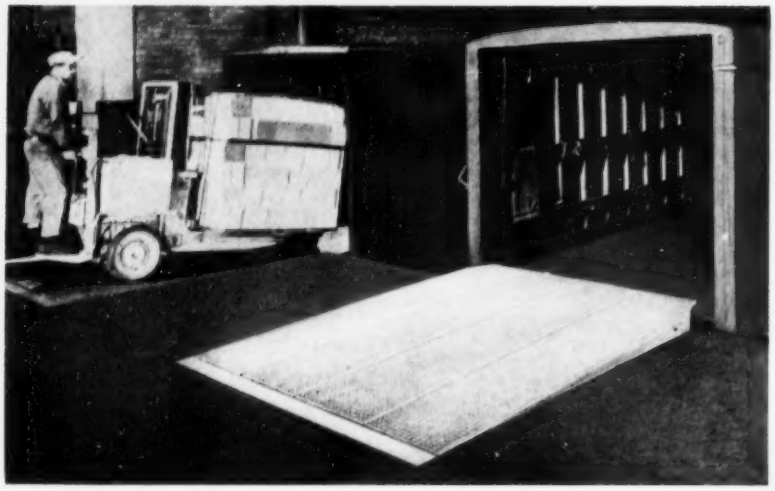
Constructed in compliance with existing military specifications, the Tug electric draw-bar pull tractor has 2000-lb pull capacity.

Other characteristics include automotive-type steering, foot-controlled acceleration with four speeds in either direction, and a new double reduction drive axle.

Suspension is on semi-elliptic springs, front and rear; service brakes are large area, hydraulically actuated. Parking brake is interlocked with driver's seat. Wheel rims and tires are demountable.

Mercury Manufacturing Co, 4044 S Halstead St, Chicago, Ill

Booth 1533



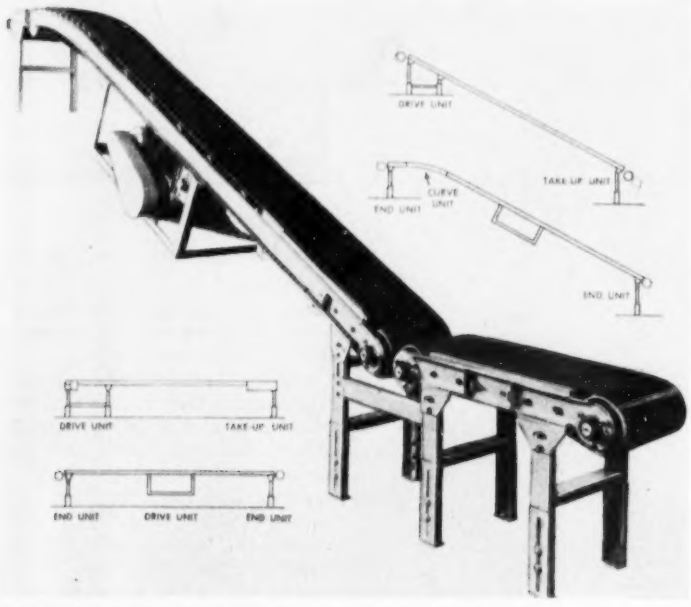
Leva-Dock Hydraulic Loading Ramp

Self-contained, hydraulic loading ramp needs no special wiring or piping. The hydraulic reservoir is mounted in the torque-tube frame, and the only external electrical connections are the power leads and control wires.

Ramp automatically compensates for out-of-balance stresses during loading and unloading, and a built-in safety device locks the ramp in position during use.

The Leva-Dock becomes an integral part of the dock when not being used, and has a rated capacity of 20,000 lb.

Rotary Lift Co, P. O. Box 2177, Memphis 2, Tenn **Booth 344**



CUSTOM-BUILT BELT CONVEYOR may be assembled from stock units of various sizes, shapes, and capacities. Conveyors so constructed can readily be adapted to meet changes in handling requirements—*Conveyor Specialty Co, Inc, North Quincy 17, Mass* **Booth 1100**

Elwell-Parker Electric Fork Truck Built for Congested Areas

Trucking in congested areas is said to be speeded with the model F38T electric lift truck. Short wheelbase and single-wheel, caster-type steering contribute to ease and speed of handling. The operator stands on the rear platform of the truck, which is electrically powered.

Rated capacity of the truck is 2000 lb at 15 in. Other characteristics include non-reversible steering, clear operator vision, and high speed drive reduction.

The Elwell-Parker Electric Co, Cleveland 3, Ohio

Booth 1134

Ruger Floor Crane Has Variable Speed Pump

Portable hydraulic floor crane has variable-speed hydraulic pump, adjusted by turning threaded pump arm, changing the height of the fulcrum block.

"No-tip" stabilizers ride over irregularities on the floor surface, but provide stability when lifting heavy loads. Telescoping boom extends into less accessible places.

Model HP18B has rated capacities of 1, 2, or 3 tons. Its new hydraulic system is said to reduce pumping effort by 30%.

Other models include HP2WH, a two-ton, high mast crane built on extra-wide base for added stability; also HP2A, a two-ton crane, said to be the only adjustable-leg crane made with positive steering, with leg widths adjustable to 22, 39 or 51 in.

Ruger Equipment, Inc, Uhrichsville, Ohio

Booth 1454

Clark Doors Add Safety Features

Automatic reversing switch reverses industrial door instantly if it begins to close on an obstruction. Switch is built into rubber astragals at bottom of door, is available at extra cost on Prest-O-Matic doors.

Manual release is now standard on all doors of this manufacturer. In case of electric failure, doors can be operated manually.

Clark Door Co, Inc, 515 Hunterdon St, Newark 8, N J

Booth 141

Steel Angle Conveyor Belting Carries Up or Down 55° Grade

Packages and cartons can glide up or down grades as steep as 55 degrees on the Griptop conveyor belt, according to the manufacturer.

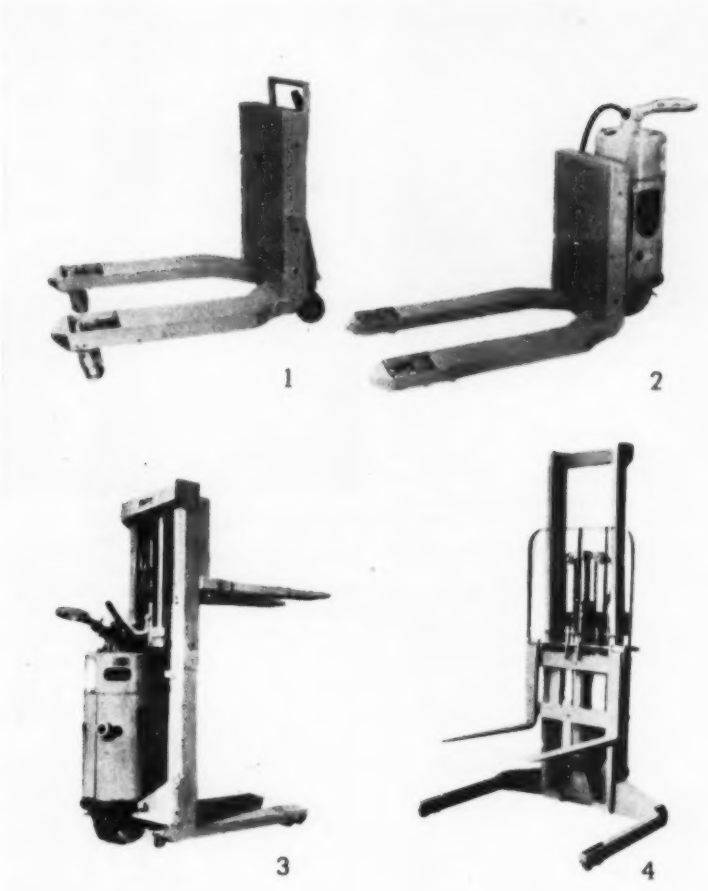
The belt has a special ridged and cross-cut rubber surface which provides extra gripping power. The 1/4-in. parallel molded rubber ridges are cross-cut to form more than 5700 blocks of rubber per square foot.

As the belt travels around pulleys, the ridges of the blocks fan out and release material which may have lodged in the grooves.

Uniformity of design is said to allow cover to wear at a constant rate. Initial carrying angle is maintained throughout the life of the belt.

B. F. Goodrich Rubber Co, Akron, Ohio

Booth 104



MATLING LINE consists of four basic units:

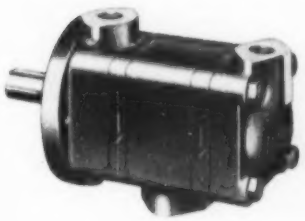
1—Hand transporter; 22 or 27-in. wide; capacities 1000 to 3000 lb; standard forks 34-in., other sizes optional.

2—Power transporter; gasoline-powered; 22 or 27-in. wide; capacities 1000 to 3000 lb; standard forks 34 in., other sizes optional.

3—Straddle-type 4-ft 6-in. stacker; gasoline or ac powered; standard to straddle 22, 36, 40 or 48-in. pallets, other widths optional; 1000 to 2000 lb capacity; 30 or 36-in. forks standard.

4—Straddle-type, hinged-mast 9-ft stacker; gasoline or ac powered; standard to straddle pallets to 40 or 48-in. wide; 1000 to 2000 lb capacity; 30 or 36-in. forks — *American Matling Corp, Importers, 13721 Joy Rd, Detroit 28, Mich*

Booth 1021



Vickers Double Pumps Power Dual Systems

Mobile applications where two independent hydraulic pumps are required can be handled by two new models, Series V-2200 and V-3200. Basic design is standard, including balanced pressure and automatic adjustment of radial and axial clearances.

Special feature is that both pumps are vane types, driven by a single common shaft in a one-unit housing. Lower maintenance and improved operating characteristics are claimed for such uses as with materials-handling equipment and road machinery. One suggestion is that power steering may be added to the usual hydraulic functions in such equipment.

V-2200 is in ten sizes with any combination of 2-, 5-, 8-, or 11-gpm capacities. V-3200 is available with 2, 5, 8, or 11 gpm at one end, and 12, 15, 18, or 24 gpm at the other. Choice of shafts and mountings is available.

Vickers, Inc, Div of Sperry Corp, Oakman Blvd, Detroit 32, Mich

Booth 705

Structural Changes in Exide TH Increase Battery Capacity

Improved design and new materials are reported to increase the capacity of the Exide TH battery 20% over previous models, with no increase in size.

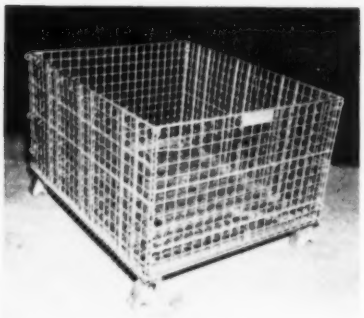
Contributing to the increased capacity are larger positive plates and extra-heavy negative plates. New homogenized sealing compound, pormax long-life separators, and seamless rubber jars are said to improve the performance of the TH battery. Grids contain corrosion-resistant Silvium which increases battery life. Polyethylene non-oxidizing slotted plastic tubes retain active material in constant contact with the grid splines, yet permit free electrolyte penetration throughout the active material. A polyethylene acid-proof tube-sealer is fitted to the bottom of the positive plate, sealing in the active material.

Trays are sprayed with a plastic coating which is acid-resistant and possesses high insulating qualities. Quarter-turn plastic vent plugs simplify servicing with water.

The battery is designed for use on all types of battery-powered materials-handling equipment.

Electric Storage Battery Co, 42 S Fifteenth St, Philadelphia, Pa

Booth 1549



Clearview Cargotainer Stacks Higher, Easier

Elimination of center legs of the 1953 Cargotainer permits working with any generally used type of equipment. Also, container may be stacked vertically as high as space permits, which was not possible with earlier models.

Stacking is easier with the four leg arrangement; the truck operator locates the two rear legs, and the far legs are automatically in place.

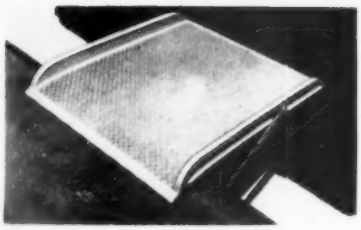
A simplified, sturdier lock is said to remain fastened during any loading or carrying impact.

Pittsburgh Steel Products Co, Pittsburgh, Pa

Booth 214

MOTORIZED ATTACHMENT to power floor sweeper is mounted on a rubber-tired steel chassis, contains a 1-hp gasoline engine, and is coupled to the sweeper by means of steel arms. Recommended for use in large, unobstructed areas, the attachment is said to be quickly detachable for manual use in close quarters. Unit fits 1951 and subsequent models of the Parker industrial sweeper — ***Parker Sweeper Co, 56 Bechtel Ave, Springfield, Ohio***

Booth 334



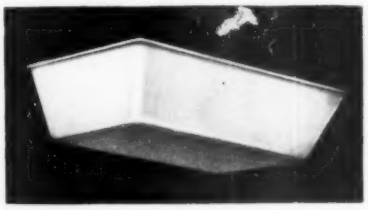
Magnesium Loading Dock Crowned, Anchored

Designed for truck loading, all-magnesium loading boards are crowned to compensate for height differences between truck and dock, can be reversed when the truck bed is lower than the dock. A patented automatic drop-lock anchors the board in position. Rated capacities are either 1000 lb per axle or 2000 lb per axle, and several sizes are available.

The board is designed so that a truck can back to within three inches of the dock.

Magline, Inc, Pinconning, Mich

Booth 604



Fiberglas Tote Pans Strong, Lightweight

Reinforced Fiberglas tote pans are lighter than aluminum, stronger by weight than most metals. Resistant to water, oil, and most chemicals, pans can be steam-cleaned or subjected to freezing temperatures without damage. Available sizes are 18x12x8, 14x11x4, and 24x20x10½ in. Pans made with molded-in colors are available in 18x12x1 in.

G. B. Lewis Co, Watertown, Wis

Booth 1300

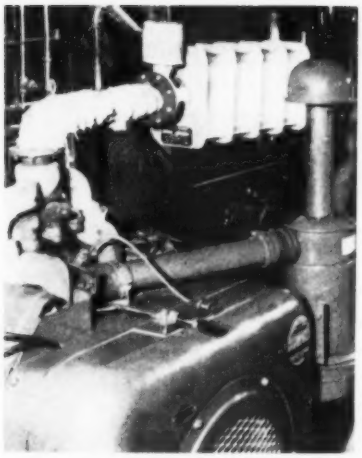
Elwell-Parker Lift Truck Includes Electromagnetic Clutch

Mechanical clutch is eliminated in the Model GF30TD, where the clutch has been replaced by an electromagnetic drive unit. This unit consists of a rotating field acting as driving member and a magnetic armature acting as driven member.

Model GF30TD is a gasoline-powered lift truck with a rated capacity of 4000 lb.

The Elwell-Parker Electric Co, Cleveland 3, Ohio

Booth 1134



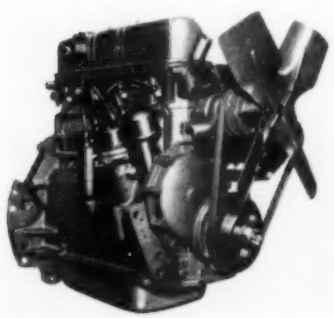
Catalytic Muffler Purifies Exhaust

Harmful vapors are removed from the exhaust of non-leaded-gasoline engines by the OCM catalytic muffler. The device is said to permit operation of fork-lift trucks in confined plant areas with complete safety.

The basic unit of the muffler is the Oxycat, a cartridge of specially treated rods which burn carbon monoxide and other harmful vapors. On leaving the muffler, the exhaust contains mostly carbon dioxide and water, with only slight traces of the original contaminants.

The OCM muffler can be used on any engine burning unleaded gasoline. According to the manufacturer, engines running on leaded gasoline can easly be converted for catalyst operation.

Oxy-Catalyst, Inc, Wayne, Pa
Booth 922



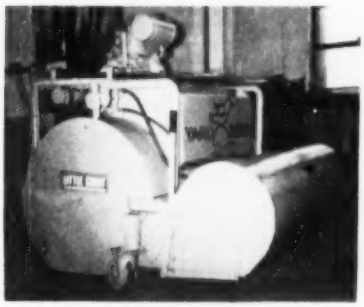
Ford Adds 45 hp Industrial Engine

Latest addition to the family of Ford industrial engines is the "134" which develops 45 bhp at 2400 rpm. The four-cylinder overhead-valve engine has a 3.4375-in. bore, 3.6-in. stroke. Cylinders are cast in block, lined with centrifugal cast sleeves. Overhead, free-turn valves are chrome nickel alloy.

Copper-leaded bearings are thin shell, replaceable. The oil system has a full-flow filter with replaceable cartridge. Full-length water jackets completely surround each cylinder.

According to the manufacturer, the engine has been designed for maximum efficiency and economy.

Ford Motor Co, Tractor and Industrial Engine Div, Dearborn, Mich
Booth 1821



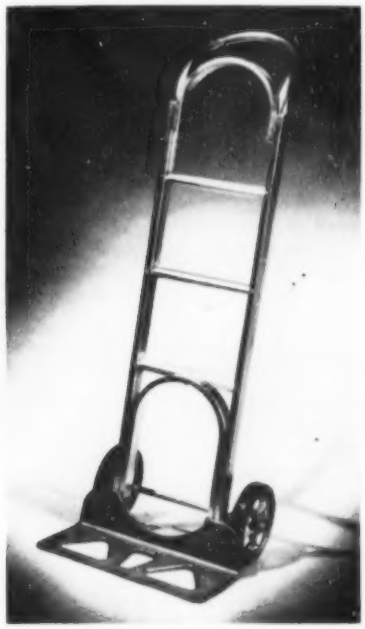
Yard Bird Sweeper Increases Capacity

Mounting on the forks of any standard fork truck, the Yard Bird sweeper is said to pick up everything from steel shavings to brickbats. Recent changes include an enlarged pick-up pan, with three times the capacity of earlier models, and a flexible mount with caster support, which is designed to follow irregular floor contours.

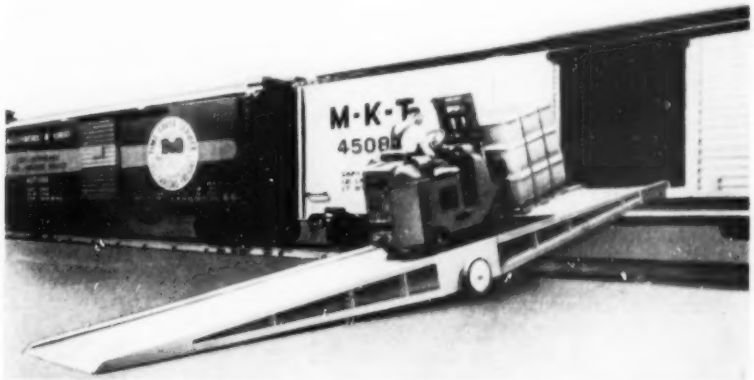
The sweeper is equipped with built-in 35-gal sprinkler system. Moving at 5 mph, the Yard Bird is said to clean up to 80,000 sq ft of floor area per hour.

The sweeper mechanism consists of a 6.8 hp gasoline motor turning at 2400 rpm, with integral reduction unit driving the brush at 164 rpm.

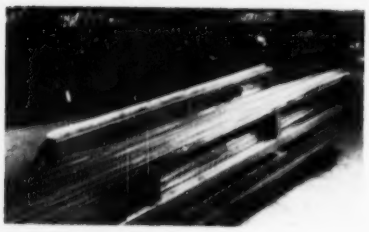
Little Giant Products, Inc, 1530-50 N Adams St, Peoria 3, Ill. **Booth 1805**



WEIGHING ONLY 18 lb, magnesium hand truck has rated capacity of 500 lb. Bolted tubular construction provides cheap, easy replacement of damaged parts — *Magnesium Company of America, East Chicago 19, Ind*
Booth 1126



ONE MAN CAN HANDLE this 30-ft magnesium loading ramp. Designed for loading freight cars where no dock facilities exist, this ramp can be rolled into place wherever needed. Rated capacity is 6000 to 16000 lb. — *Magnesium Company of America, East Chicago 19, Ind*
Booth 1126



Fab-Weld Racks Handle Bar Stock

Welded racks made with structural and formed sections are designed to carry bar stock, pipe, and other mill-length stock either loose or bundled up to a capacity of 10,000 lb per rack. They can be lifted or moved with tongs, fork lift truck, crane, or hoist.

Fab-Weld Corp, Pickwick & Richmond Sts, Philadelphia 3½, Pa

Booth 1505

Lift Truck Attachment Added to Moto-Bug Line

Lightweight (1500 lb) lift truck is the result of adding a power-driven attachment to the standard Moto-Bug. The device then has a rated capacity of 1000 lb at 15 in. load center, and is said to be capable of climbing a 12% grade with full load. Turning radius is 61 in. The truck has a 5-ft hydraulic lift. Standard forks are 20 in. long (30 in. optional), adjustable from 8 to 32 in. wide.

The lift truck is one of several attachments for the Moto-Bug.

Koehring Co, 3026 W Concordia Ave, Milwaukee 16, Wis

Booth 1013

Mechanical Furnace Loader Meters Flow of Work

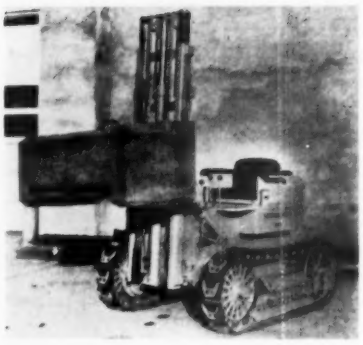
Metered flow of small workpieces to heat-treating is accomplished with the Man-O-Steel furnace loader.

The loader is basically a series of reciprocating, inclined steps. Pieces are placed in the hopper at the base of the loader. As the first step rises, it picks up a quantity of material and, continuing upward, gravity-feeds to the next step, which then rises and feeds, and so on, up to the top step. There the work is fed to an endless-belt heat-treat furnace.

Advantages claimed for the Man-O-Steel are reduced labor cost, even flow of work and more consistent quality of work. Rated capacity range is 500 to 4000 lb per hour.

Michigan Crane and Conveyor Co, 115 N McKinstry Ave, Detroit 9, Mich

Booth 501



Terra-Lift Fork-Lift Crawler Operates Inside, Outside

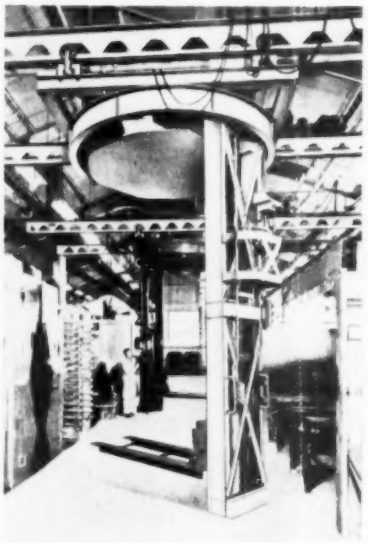
Outside material handling is simplified by Terra-Lift, a crawler fork-lift. According to the manufacturer, the crawler will operate in mud 6-in. deep. For inside use, rubber track shoes are available as optional equipment.

Terra-Lift is powered by a 4-cylinder gasoline engine, uses 6-volt starter, mechanical governor, and positive-pressure lubrication. Capacity of model M-2 is 2000 lb, of M-4, 4000 lb.

Accessories convert crawler to other uses, including bulldozer, angledozer, and snowplow.

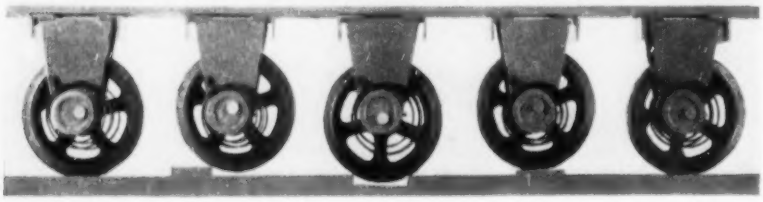
American Tractor Corp, Churubusco, Ind

Booth 926



HANDLING IN NARROW AISLES is said to be speeded with the Whiting stacker crane. The mast, on which lift forks are mounted, rotates 360°, is suspended from an overhead crane—*Whiting Corp, Harvey, Ill*

Booth 1138



SUSPENDED ON DUAL SPRINGS, the swinging hub caster eliminates much of the vibration common to material handling on rough floor. Available in either swivel or rigid models—*Standard Manufacturing Co, Mt Airy, N C* **Booth 138**

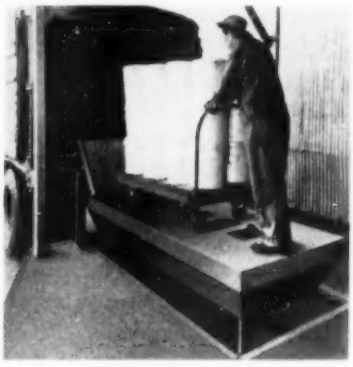
King Bolt Eliminated From Swivel Caster

King bolt failure of swivel casters is eliminated in the Dean caster, which replaces the bolt with a swivel plate floating within a bearing assembly. This design is said to absorb both radial and thrust loads.

The swivel is said to be waterproof, even when completely immersed, because of a special seal that also acts as a grease retainer.

Lansing Co Lansing, Mich

Booth 325



LOADING PLATFORM AUTOMATICALLY raises or lowers load from dock to truck or trailer floor. As load crosses trip-bar, hydraulically-powered Load-O-Matic moves toward truck level. Movement stops when level is reached. When the empty load truck strikes trip-bar from opposite direction platform descends to dock level. Rated capacity is 6000 lb. Lift of standard models is 30 in., in any range from 30 in. below to 30 in. above dock. Longer stroke lifts available — *Field Engineering Co, 66 Foote Ave, Jamestown, N Y*

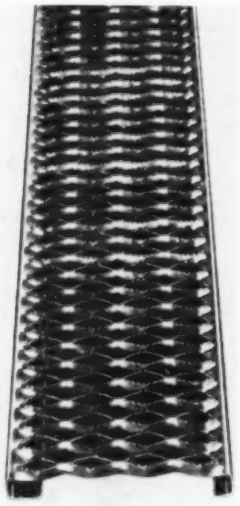
Booth 1825

Varilift Speeds Hand Trucks

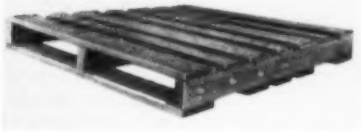
Manual lift trucks carrying different weight loads are said to load as much as 400% faster, because of Varilift—a hydraulic lifting system which matches the lifting speed to the weight of the load. Trucks so equipped are available with lift capacities from 500 to 3000 lb, lifting heights from 36 to 98 in.

Allied Mfg and Sales Corp, 201 N. Wells St, Chicago 6, Ill

Booth 114



SECTIONS OF A NEW SAFETY GRATING are formed from one piece of metal by slitting and folding, rather than expanding the material. Metal is neither punched out nor added in manufacture. The grating is said to give increased strength and non-skid properties with minimum weight. Available in either steel or aluminum, the grating is made in many shapes for different applications such as stair-treads, catwalks, and industrial grilles —*Grip-Strut Div, The Globe Co, 4000 S Princeton Ave, Chicago 9, Ill*



PALLET NAILS ARE CLINCHED in holes drilled through the center line of Clinch-Tite pallets. Holes are then plugged, giving added strength. Stringers are paraffin-dipped; nail holes are pre-drilled and counterbored to prevent splitting—*Clinch-Tite Pallet Co, 50 Fairfield St, Boston 16, Mass*

Booth 336

Coles Crane Equipment Includes Gasoline-Electric Power Control

Gasoline-electric control of the Coles crane is said to give smoother power, more accurate handling, and eliminates the need for mechanical clutches and transmission systems. Cheaper maintenance is also claimed for this system. Cranes are also equipped with safe load indicator, designed to keep loads within the rated capacity of the crane. Added also is power-assisted steering, for easier maneuvering in restricted areas.

Cranes are available in 7½-ton capacity, with 17-ft boom, or 12-ton capacity, with 30-ft boom. Cantilever-type boom enables operators to work closer to the load.

Coles Cranes, Inc, P O Box 942, Joliet, Ill

Booth 1333-B

Skid Racks Assembled Without Bolts or Welding

Prefabricated skid racks are assembled with only a hammer. Sections fit together without bolting or welding. Made of heavy square tubing, racks may be built to any height desired. Available in standard, heavy duty, or extra-heavy duty models.

American Sales Engineers, Agents for American Metal Products Co, Detroit, Mich

Booth 832

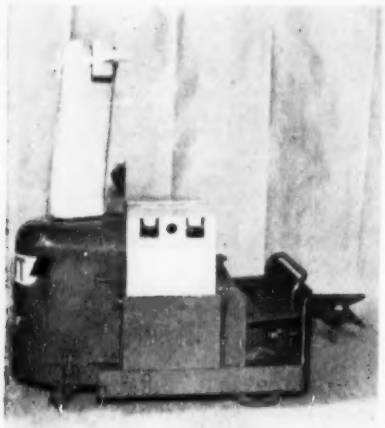
Globe Hydraulic Loading Ramp Requires No Excavation

Self-leveling hydraulic loading ramp has a self-contained power unit—short-stroke hydraulic cylinder, oil reservoir, and electric motor oil pump—mounted on a base plate under the ramp. One end of the ramp rides on the bed of the vehicle being loaded; the other is hinged to the loading platform.

Three standard models, with load capacities of 10,000, 16,000 and 20,000 lb are available, with platform sizes of 5x6 ft or 6x8 ft. A retractable or extendable lip is offered as an accessory. Batteries of two to eight ramps may be operated from a single pump unit.

Globe Hoist Co, E Mermaid Lane at Queen St, Philadelphia 18, Pa

Booth 1252



Radio Remote-Control For Barrett Equipment

Radio remote-control for Barrett handling equipment is now available. Carrying a 14-oz. control box attached to his belt, an operator can control a specially equipped truck as far as 150 ft away.

The radio equipment is furnished as an accessory to standard Barrett trucks, and all trucks so equipped can be operated manually without disconnecting the radio control mechanism.

Licensing this equipment with FCC has been taken care of, according to the manufacturer.

Approximate prices for the Tractor-Ox shown are, truck, $1380; battery, $650; radio remote-control equipment, $1400. The radio control can also be attached to the Power-Ox, for materials on skids, and the Pallet Ox, for pallets.

Barrett-Cravens Co, 4613 S Western Blvd, Chicago 9, Ill.

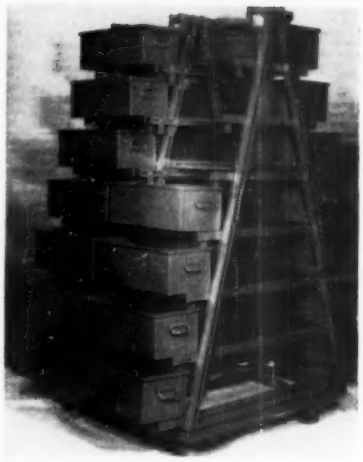
Booth 1350

Cesco Dumper Capacity Up, Microswitches Added

Several improvements have been made in the Cesco dumper, a portable elevator which lifts, up-ends, and dumps as many as 100 loads of material an hour. Capacity is now 1500 lb. Top and bottom limit switches have been replaced by screw-type microswitches. Motor hoist is now integral with geared motor.

Dumper is available in several sizes from 5 to 20 ft dumping heights, rolls from place to place on swivel casters. Equipment is adjustable to handle bags, drums, barrels, and boxes.

Colson Equipment and Supply Co, Los Angeles, Calif **Booth 837**



Steel Framing Material Assembled with Bolts and Fittings

Steel frames of many shapes can be assembled from the three basic units of Mult-A-Frame—channel frames, spring T-bolts, and fittings. The frames are purchased in standard lengths, cut to desired size and assembled. Since there is no welding or riveting, an assembled frame which has become obsolete can be dismantled and its components reassembled in a different shape. The only tool required for assembly is a common wrench.

Ainsworth Manufacturing Corp, 2200 Franklin St, Detroit 7, Mich

Lorain 30-Ton Crane Runs on Rubber Tires

Model SP-524 is rated at 30-tons capacity and equipped with a boom 100 ft. long, to which can be added a 25-ft. tip extension. Sections of the boom are pin-connected and welded.

Engine drive is to the two rear axles, providing four speeds up to 7½ mph in both directions. Air brakes and pneumatic steering are provided. Overall width is 123 in.

The Thew Shovel Co, Lorain, Ohio

Booth 1325B

Fairbanks Series 27 Casters Double-Race, Swivel

Series 27 double race steel swivel casters are of welded construction. The large-diameter outer ball race has provision for pressure lubrication. A Timken thrust bearing relieves the load on the countersunk king-bolt. The caster is standard with a replaceable bolt axle, and is available in several sizes and materials.

The Fairbanks Co, 393 Lafayette St, New York 3, N Y **Booth 520**

. . . IT'S THE Cost per Cut THAT Counts

Study these high production, low cost figures on three Motch & Merryweather Circular Sawing Machines

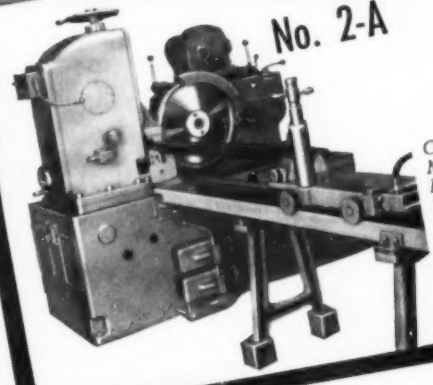
Make your own study of the cost per cut in your metal-sawing department. Then find out from Motch & Merryweather how much production at lower cost you can get on M. & M. Circular Sawing Machines, using our Triple-Chip blades.

Operation: Steel door frames (mitre cut).
Material: Rolled steel shapes 6" wide x 1/16" thick.
Production: 200 pieces per hour.
Tool cost per piece: $.0002.

No. 00-G

M. & M. No. 00-G Circular Sawing Machine. Manual or automatic stock feed. Readily adaptable to making cuts at angles up to 45° as well as high production square cut-off. Capacity: up to 3" diameter round; shapes—up to 3-3/8" x 6".

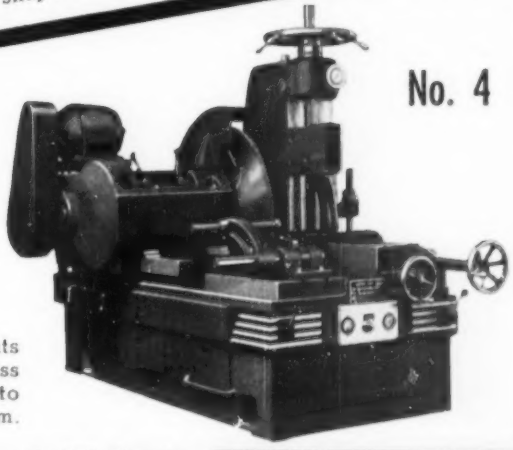
No. 2-A



Operation: Rocket nozzle stock cut to length.
Material: S. A. E. 1020, 5" diameter.
Production: 60 pieces per hour.
Tool cost per piece: $.001.

The No. 2-A machine pictured at the left has automatic stock feed up to 72" cut-off lengths. It is offered also with manual stock feed. Capacity: up to 6-1/2" diameter round; structural shapes—up to 5" x 12".

No. 4



Operation: Forging billets cut to length.
Material: S. A. E. 1045, 14" square.
Production: 6 pieces per hour.
Tool cost per piece: $.12.

No. 4. Widely used in steel and structural steel plants and forge plants sawing all types of forging, stainless and titanium alloys, die block steel, etc. Capacity: to 17" dia. round; structural shapes up to 24" I-beam.

Complete size range, ferrous or non-ferrous, up to 43" diameter.

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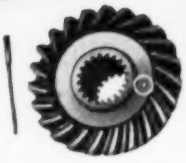
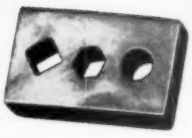
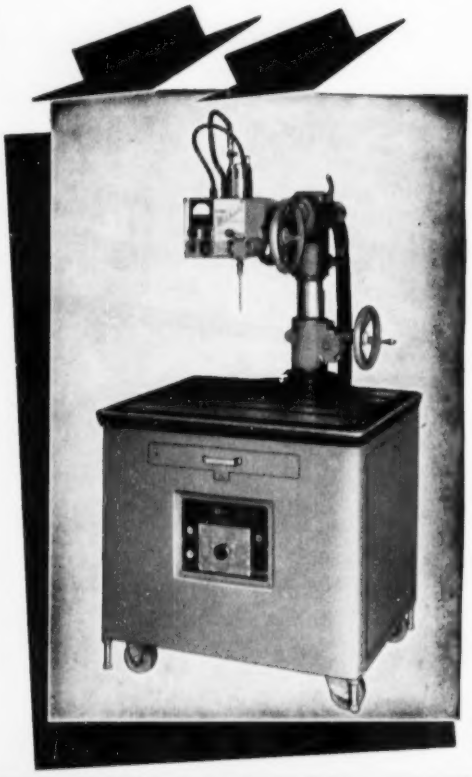


Cut oil holes in hardened gears without annealing

Cut dovetails in hardened dies



Cut any shape hole in cemented carbides



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REFERENCE BOOK SHEET

Cutting-Time Calculations

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By V G HOTCHKISS, Industrial Engineer, DEERE & CO

ACTUAL MINUTES

Per 1 Inch Diameter and 1 Inch Length of Cut

	Speed (FPM)	.328	.262	.211	.168	.134	.107	.086	.069	.055	.044	.035
		.Feed (Inches Per Revolution)										
Steel Castings	180	.0044	.0055	.0070	.0087	.0108	.0136	.0170	.0212	.0265	.0331	.0414
	190	.0042	.0053	.0066	.0082	.0103	.0129	.0161	.0201	.0252	.0314	.0393
	200	.0040	.0050	.0063	.0078	.0098	.0122	.0153	.0191	.0238	.0298	.0373
	210	.0038	.0048	.0060	.0074	.0093	.0116	.0145	.0182	.0227	.0284	.0355
	220	.0036	.0046	.0057	.0071	.0089	.0111	.0139	.0173	.0217	.0272	.0340
Malleable & Grey Iron	230	.0035	.0044	.0054	.0068	.0085	.0106	.0133	.0166	.0208	.0260	.0324
	240	.0033	.0042	.0052	.0065	.0081	.0102	.0127	.0159	.0199	.0249	.0311
	250	.0032	.0040	.0050	.0063	.0078	.0098	.0122	.0153	.0191	.0238	.0298
SAE 1045 Steel SAE 3115 Steel	260	.0031	.0039	.0048	.0060	.0075	.0094	.0117	.0147	.0184	.0230	.0287
	270	.0030	.0037	.0046	.0058	.0072	.0090	.0113	.0141	.0177	.0221	.0276
	280	.0029	.0036	.0045	.0056	.0070	.0087	.0109	.0136	.0170	.0213	.0266
	290	.0028	.0035	.0043	.0054	.0068	.0084	.0105	.0132	.0165	.0206	.0258
	300	.0027	.0033	.0042	.0052	.0065	.0081	.0102	.0127	.0159	.0199	.0249
	310	.0026	.0032	.0040	.0050	.0063	.0079	.0098	.0123	.0154	.0192	.0240
SAE 2320 Steel	320	.0025	.0031	.0039	.0049	.0061	.0076	.0096	.0119	.0150	.0187	.0234
	330	.0024	.0030	.0038	.0047	.0059	.0074	.0093	.0116	.0145	.0181	.0227
	340	.0024	.0029	.0037	.0046	.0057	.0072	.0090	.0112	.0141	.0176	.0220
	350	.0023	.0029	.0036	.0045	.0056	.0070	.0087	.0109	.0137	.0171	.0213
SAE 1020 Steel	360	.0022	.0028	.0035	.0043	.0054	.0068	.0085	.0106	.0133	.0166	.0207
	370	.0022	.0027	.0034	.0042	.0053	.0066	.0083	.0103	.0129	.0161	.0202
	380	.0021	.0026	.0033	.0041	.0052	.0064	.0081	.0101	.0126	.0157	.0197
	390	.0021	.0026	.0032	.0040	.0050	.0062	.0078	.0098	.0122	.0153	.0191
	400	.0020	.0025	.0031	.0039	.0049	.0061	.0076	.0095	.0119	.0149	.0186
		Cut-Off Feeds					Finishing Feeds			Roughing Feeds		

By the use of the accompanying table, it is possible to calculate cutting time in minutes at recommended speeds and feeds for turning, boring, cutting-off, etc, with single-point carbide tools. Recommended speeds in fpm for various materials are given at the left of the chart. These bracketed speeds cover the minimum for roughing to the maximum for finishing.

Body of the table is separated into three groups of suggested feeds: first section, to left of first heavy line—cut-off feeds, and similar cutting where the tool is confined; second section, between two heavy lines—finishing feeds, and third section, to right of the second heavy line—roughing feeds.

The actual time for making a 1-in. cut on 1-in. dia stock is given above each column of feeds. Thus, for any other length of cut and work dia, it is necessary only to multiply the dia of the cut by the length of the cut by actual minutes.

Cut-off speeds in fpm with HSS tools will be considerably lower than the values cited. The stated speed may be divided in half, thirds or quarters, and the actual minutes doubled, tripled or quadrupled.

To read the table, find desired fpm in left-hand column, move right to selected feed value and up to top of table, to get cutting time in minutes for 1-in. dia by 1-in. length of cut. Example: for 260 fpm and 0.006 ipr, cutting time equals 0.168 min.

SAMPLE CALCULATIONS: work dia —2 in.; work length—8.375 in.; speed—260 fpm; feed—.006 ipr, and unit time—0.168 min.

Actual cutting time equals 0.168 × 2 × 8.375, equals 2.81 min.

NOTES:

1. If machine feeds do not correspond with tabulated feeds, use nearest tabulated feed, and result will be within 12½%. If exact time is required, find percentage of feed in table to exact feed and multiply by equal minutes. *Example:* to use 260 fpm and 0.007 ipr, but tabulated feed is 0.0075 ipr. Then, 0.0075/0.007 equals 107%. Actual minutes equals 1.07 × 0.134, equals 0.144 min.

2. If the nearest shown speed is used, accuracy will be within 3 to 6%.

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American Machinist REFERENCE BOOK SHEET

Tolerances for Angles...I

BY VERNON H. RUSSELL, Supervisor Tool Design, Slide Fastener Div, SCOVILL MFG CO.

All successful manufacture of parts is prefaced by two important conditions: (1) can this part be produced, and cheaply, and, (2) can it be produced by interchangeable manufacturing. Upon the engineer and designer lies the responsibility for placing correct tolerances on parts so that both these conditions can be met.

Much has been said about linear tolerances and their results. This article deals with angular tolerances with the hope that from it the engineer, designer and detailer may be able to designate angular tolerance more quickly and accurately.

In the following table (page 195), the specific angles are given in the left-hand column. For angles in between, use the nearest angle, i.e., for 27°36′ use 28°; for 17°18′ use 17°.

The row of figures to the right of the specific angles represent either the specific angle minus (above) or the specific angle plus (below)

i.e., $25^{\circ}\ \begin{matrix} 0.0036 = 24^{\circ}59' \\ 0.0035 = 25^{\circ}1' \end{matrix}$

The headings at the top represent the tolerance in minutes for the linear tolerances given in the columns below. Assume a simple part is dimensioned as shown in Fig. 1, and that the dimension expected from the base of the angle to the top vary not more than ± 0.004, as shown in Fig. 2. In this case the basic angle is known, but the tolerance that will have to be held on the angle depends upon the tolerance given, in this instance as the X dimension ± 0.004.

To find the angle tolerance, use this simple formula:

Angular Tolerance for Specific Angle = Expected Tolerance (Linear) in One Direction divided by Length of Dimension (Side Adj.)

In this case, the formula may be interpreted as follows: 0.004/1.000 = 0.004.

Now look for 0.004 in the chart opposite 30° and see that under the column 10′ may be found two entries: 0.00387-0.00389. This is the closest tolerance (in minutes) that can be obtained. Therefore, the tolerance on 30° should read plus or minus 10′.

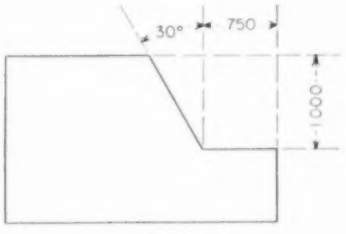

Fig. 1

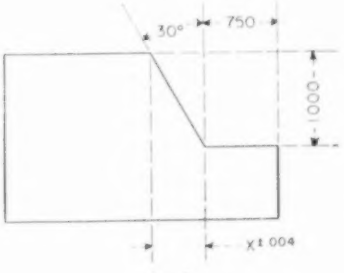

Fig. 2

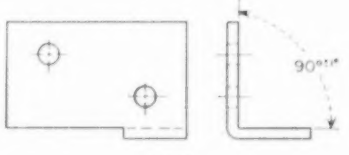

Fig. 3

For tolerances that do not appear on the chart, proceed thus: Suppose the result being looked for in the chart (opposite 30°) was 0.007. It is found that the sum of tolerances for 15′ and 3′ gives an answer of 0.00696. Therefore, the angular tolerance would read 15′ plus 3′, or ± 18′. When the exact tolerance may not be found in the chart, it is better to use the nearest lower tolerance.

Too many close tolerances can increase the cost price of the finished article. It is wise to study tolerances and make them as broad as possible. These possibly broader tolerances may mean an entirely different approach to the problem of manufacturing the article. Consider the simple product with a bent tab, Fig. 3. The tolerance 90° ± 1° may entail a complicated tool and tightly dimensioned tool parts. Study of this tab, its length, its mating part, etc., could easily result in changing this angular tolerance to 90° ± 5′, and thereby result in a less complicated tool and much cheaper tool parts necessary to hold this product to size.

In all design, much time is saved by being as generous as possible with angular tolerances. Nothing is as futile as concentrated toolroom effort to manufacture a part that could be more loosely dimensioned.

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REFERENCE BOOK SHEET

Tolerances for Angles...II

TOLERANCE OF ANGLE ± Length = 1.000

ANGLE IN DEGREES	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	30′	1°
15′	0.00029	0.00058	0.00087	0.00116	0.00145	0.00174	0.00203	0.00232	0.00261	0.00291	0.00320	0.00349	0.00378	0.00407	0.00436		
	0.00029	0.00059	0.00088	0.00117	0.00146	0.00175	0.00204	0.00233	0.00262	0.00291	0.00320	0.00349	0.00379	0.00408	0.00437	0.00873	
30′	0.00029	0.00058	0.00088	0.00117	0.00146	0.00175	0.00204	0.00233	0.00262	0.00291	0.00320	0.00349	0.00378	0.00408	0.00437	0.00873	
	0.00029	0.00058	0.00087	0.00116	0.00145	0.00174	0.00203	0.00232	0.00262	0.00291	0.00320	0.00349	0.00378	0.00407	0.00436	0.00873	
1°	0.00029	0.00059	0.00088	0.00117	0.00146	0.00175	0.00204	0.00233	0.00262	0.00291	0.00321	0.00350	0.00379	0.00408	0.00437	0.00873	0.01746
	0.00029	0.00058	0.00087	0.00116	0.00145	0.00174	0.00203	0.00232	0.00261	0.00291	0.00320	0.00349	0.00378	0.00407	0.00436	0.00873	
2	0.00029	0.00058	0.00087	0.00116	0.00146	0.00175	0.00204	0.00233	0.00262	0.00291	0.00320	0.00349	0.00378	0.00408	0.00437	0.00873	0.01746
	0.00029	0.00058	0.00087	0.00117	0.00146	0.00175	0.00204	0.00233	0.00262	0.00291	0.00320	0.00350	0.00379	0.00408	0.00437	0.00874	
3	0.00029	0.00059	0.00088	0.00117	0.00146	0.00175	0.00204	0.00234	0.00263	0.00292	0.00321	0.00350	0.00379	0.00408	0.00438	0.00875	0.01749
	0.00029	0.00058	0.00087	0.00116	0.00146	0.00175	0.00204	0.00233	0.00262	0.00292	0.00321	0.00350	0.00379	0.00408	0.00437	0.00875	
4	0.00030	0.00059	0.00088	0.00117	0.00146	0.00176	0.00205	0.00234	0.00263	0.00293	0.00322	0.00351	0.00380	0.00409	0.00439	0.00877	0.01752
	0.00029	0.00058	0.00087	0.00117	0.00146	0.00175	0.00204	0.00234	0.00263	0.00292	0.00321	0.00351	0.00380	0.00409	0.00438	0.00877	
5	0.00029	0.00059	0.00088	0.00117	0.00147	0.00176	0.00205	0.00235	0.00264	0.00293	0.00322	0.00352	0.00381	0.00410	0.00440	0.00879	0.01756
	0.00029	0.00058	0.00088	0.00117	0.00146	0.00176	0.00205	0.00234	0.00264	0.00293	0.00322	0.00352	0.00381	0.00410	0.00440	0.00880	
6	0.00029	0.00058	0.00088	0.00117	0.00147	0.00176	0.00205	0.00235	0.00264	0.00294	0.00323	0.00352	0.00382	0.00411	0.00441	0.00881	0.01761
	0.00030	0.00059	0.00089	0.00118	0.00147	0.00177	0.00206	0.00236	0.00265	0.00295	0.00324	0.00353	0.00383	0.00412	0.00442	0.00884	
7	0.00029	0.00059	0.00088	0.00118	0.00147	0.00177	0.00206	0.00236	0.00265	0.00295	0.00324	0.00354	0.00383	0.00413	0.00442	0.00884	0.01768
	0.00030	0.00060	0.00089	0.00119	0.00148	0.00178	0.00207	0.00237	0.00266	0.00296	0.00325	0.00355	0.00384	0.00414	0.00444	0.00887	
8	0.00030	0.00059	0.00089	0.00119	0.00148	0.00178	0.00208	0.00237	0.00267	0.00296	0.00326	0.00356	0.00385	0.00415	0.00445	0.00889	0.01776
	0.00030	0.00059	0.00089	0.00119	0.00148	0.00178	0.00208	0.00237	0.00267	0.00297	0.00327	0.00356	0.00386	0.00416	0.00445	0.00891	
9	0.00029	0.00059	0.00089	0.00119	0.00149	0.00178	0.00208	0.00238	0.00268	0.00298	0.00327	0.00357	0.00387	0.00417	0.00447	0.00893	0.01784
	0.00030	0.00060	0.00090	0.00120	0.00150	0.00179	0.00209	0.00239	0.00269	0.00299	0.00329	0.00358	0.00388	0.00418	0.00448	0.00896	
10	0.00030	0.00060	0.00090	0.00120	0.00150	0.00180	0.00210	0.00240	0.00270	0.00300	0.00330	0.00360	0.00390	0.00420	0.00450	0.00899	0.01795
	0.00030	0.00060	0.00090	0.00120	0.00150	0.00180	0.00210	0.00240	0.00270	0.00300	0.00330	0.00360	0.00390	0.00420	0.00450	0.00901	
11	0.00030	0.00060	0.00091	0.00122	0.00151	0.00181	0.00211	0.00241	0.00272	0.00302	0.00332	0.00362	0.00392	0.00422	0.00452	0.00904	0.01805
	0.00030	0.00060	0.00091	0.00121	0.00151	0.00181	0.00211	0.00242	0.00272	0.00302	0.00332	0.00363	0.00393	0.00423	0.00453	0.00907	
12	0.00031	0.00061	0.00092	0.00122	0.00152	0.00183	0.00213	0.00243	0.00274	0.00304	0.00335	0.00365	0.00395	0.00426	0.00456	0.00911	0.01818
	0.00030	0.00060	0.00091	0.00121	0.00152	0.00182	0.00213	0.00243	0.00273	0.00304	0.00334	0.00365	0.00395	0.00426	0.00456	0.00913	
13	0.00031	0.00061	0.00092	0.00123	0.00153	0.00184	0.00215	0.00245	0.00276	0.00306	0.00337	0.00368	0.00398	0.00429	0.00459	0.00918	0.01831
	0.00030	0.00061	0.00092	0.00122	0.00153	0.00184	0.00214	0.00245	0.00276	0.00306	0.00337	0.00368	0.00398	0.00429	0.00460	0.00921	
14	0.00031	0.00062	0.00093	0.00124	0.00155	0.00186	0.00216	0.00247	0.00278	0.00309	0.00340	0.00371	0.00401	0.00432	0.00463	0.00925	0.01846
	0.00031	0.00062	0.00093	0.00123	0.00154	0.00185	0.00216	0.00247	0.00278	0.00309	0.00340	0.00371	0.00402	0.00433	0.00464	0.00929	
15	0.00031	0.00062	0.00093	0.00125	0.00156	0.00187	0.00218	0.00249	0.00280	0.00312	0.00343	0.00374	0.00405	0.00436	0.00467	0.00933	0.01862
	0.00031	0.00062	0.00093	0.00125	0.00156	0.00187	0.00218	0.00249	0.00281	0.00312	0.00343	0.00374	0.00406	0.00437	0.00468	0.00937	
16	0.00032	0.00063	0.00095	0.00126	0.00158	0.00189	0.00221	0.00252	0.00284	0.00315	0.00346	0.00378	0.00409	0.00441	0.00471	0.00943	0.01880
	0.00031	0.00063	0.00094	0.00126	0.00157	0.00189	0.00220	0.00252	0.00283	0.00315	0.00346	0.00378	0.00409	0.00441	0.00472	0.00946	
17	0.00032	0.00064	0.00095	0.00127	0.00159	0.00191	0.00222	0.00254	0.00286	0.00318	0.00349	0.00381	0.00413	0.00445	0.00476	0.00952	0.01898
	0.00032	0.00064	0.00096	0.00127	0.00159	0.00191	0.00223	0.00255	0.00287	0.00318	0.00350	0.00382	0.00414	0.00446	0.00478	0.00957	
18	0.00032	0.00064	0.00096	0.00129	0.00161	0.00193	0.00225	0.00257	0.00289	0.00321	0.00353	0.00386	0.00418	0.00450	0.00482	0.00962	0.01919
	0.00032	0.00064	0.00096	0.00129	0.00161	0.00193	0.00225	0.00257	0.00290	0.00322	0.00354	0.00386	0.00419	0.00451	0.00483	0.00968	
19	0.00033	0.00065	0.00098	0.00130	0.00163	0.00195	0.00228	0.00260	0.00293	0.00325	0.00358	0.00390	0.00423	0.00455	0.00488	0.00973	0.01941
	0.00032	0.00065	0.00097	0.00130	0.00163	0.00195	0.00228	0.00260	0.00293	0.00325	0.00358	0.00391	0.00423	0.00456	0.00489	0.00978	
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	0.00033	0.00066	0.00099	0.00132	0.00165	0.00198	0.00231	0.00264	0.00297	0.00330	0.00363	0.00396	0.00429	0.00462	0.00495	0.00991	
21	0.00033	0.00066	0.00100	0.00133	0.00166	0.00200	0.00232	0.00266	0.00300	0.00333	0.00366	0.00400	0.00433	0.00466	0.00499	0.00998	0.01989
	0.00034	0.00067	0.00101	0.00134	0.00167	0.00201	0.00234	0.00268	0.00301	0.00335	0.00368	0.00401	0.00435	0.00468	0.00502	0.01005	
22	0.00034	0.00068	0.00102	0.00136	0.00169	0.00203	0.00237	0.00271	0.00305	0.00338	0.00372	0.00406	0.00440	0.00473	0.00507	0.01012	0.02017
	0.00033	0.00067	0.00101	0.00135	0.00169	0.00203	0.00237	0.00271	0.00304	0.00338	0.00372	0.00406	0.00440	0.00474	0.00508	0.01018	
23	0.00034	0.00068	0.00102	0.00137	0.00171	0.00205	0.00240	0.00274	0.00308	0.00342	0.00377	0.00411	0.00445	0.00479	0.00514	0.01026	0.02044
	0.00035	0.00069	0.00104	0.00138	0.00172	0.00207	0.00241	0.00275	0.00310	0.00344	0.00379	0.00413	0.00447	0.00482	0.00516	0.01034	
24	0.00035	0.00070	0.00105	0.00139	0.00174	0.00209	0.00244	0.00279	0.00313	0.00348	0.00383	0.00418	0.00452	0.00487	0.00522	0.01042	0.02076
	0.00035	0.00070	0.00104	0.00139	0.00174	0.00209	0.00244	0.00279	0.00314	0.00349	0.00384	0.00419	0.00454	0.00489	0.00524	0.01050	
25	0.00036	0.00071	0.00106	0.00142	0.00177	0.00213	0.00248	0.00283	0.00319	0.00354	0.00389	0.00425	0.00460	0.00495	0.00530	0.01058	0.02108
	0.00035	0.00071	0.00106	0.00141	0.00177	0.00212	0.00248	0.00283	0.00319	0.00354	0.00390	0.00425	0.00461	0.00497	0.00532	0.01067	
26	0.00036	0.00072	0.00108	0.00144	0.00180	0.00216	0.00252	0.00287	0.00323	0.00359	0.00395	0.00431	0.00467	0.00503	0.00539	0.01075	0.02142
	0.00036	0.00072	0.00108	0.00144	0.00180	0.00216	0.00253	0.00289	0.00325	0.00361	0.00397	0.00433	0.00469	0.00505	0.00542	0.01085	
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	0.00036	0.00073	0.00110	0.00146	0.00183	0.00220	0.00256	0.00293	0.00330	0.00366	0.00403	0.00440	0.00477	0.00514	0.00550	0.01104	
28	0.00037	0.00075	0.00112	0.00149	0.00186	0.00224	0.00261	0.00298	0.00335	0.00373	0.00410	0.00447	0.00484	0.00521	0.00558	0.01114	0.02218
	0.00037	0.00075	0.00112	0.00149	0.00187	0.00224	0.00261	0.00299	0.00336	0.00374	0.00411	0.00449	0.00486	0.00523	0.00561	0.01125	
29	0.00038	0.00076	0.00114	0.00152	0.00190	0.00228	0.00266	0.00304	0.00342	0.00380	0.00418	0.00456	0.00493	0.00531	0.00569	0.01135	0.02260
	0.00038	0.00076	0.00114	0.00152	0.00190	0.00228	0.00266	0.00305	0.00343	0.00381	0.00419	0.00457	0.00495	0.00533	0.00572	0.01146	
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	0.00039	0.00078	0.00116	0.00155	0.00194	0.00233	0.00272	0.00311	0.00350	0.00389	0.00427	0.00466	0.00505	0.00544	0.00583	0.01170	0.02351

Production News

ABOUT *Lusol*.. —THE ALL-CHEMICAL METAL-WORKING SOLUTION

FROM F. E. ANDERSON OIL COMPANY, INC. • PORTLAND, CONNECTICUT

The product is RESTRICTED
but the STORY of this
"Production-Booster" can be told

"A serviceman, in our plant to repair a turret lathe, found us having trouble machining 86-40 steel tubing. We had already tried seven different cutting oils without success, but he said 'Try Lusol.' It proved to be a revelation and a very happy day for us. Not only were we able to lengthen chaser life manyfold per grind, but also boring, cutting and facing-tool life increased correspondingly."

Their Success Story Continues:

"After this amazing performance, we tried Lusol in a battery of double-end boring and tapping machines. Our results duplicated those on the turret lathes . . . We then put Lusol in our Marvel hacksaws, whereupon bad odor disappeared immediately, all smoke was eliminated and saw life was better than doubled.

"Our next experience with Lusol as a coolant was on Cincinnati centerless grinders. Again we noticed a tremendous increase in life on both grinding and regulating wheels. Then we adopted it for general drilling and tapping operations, lathes and production milling machines. *We consider ourselves fortunate to have been introduced to Lusol."*

LUSOL'S BEEN WORKING HERE 2 YEARS

Good housekeeping, we're frank to say, has a lot to do with Lusol's fine performance here. A clean machine enables this unusual metal-working solution to retain the properties that make it different—faster heat dissipation, a longer useful life, no odors, no gumming, no skin irritation.

You're aware of good housekeeping from the moment you enter this plant—from the cutoff saws, where Lusol gets in its first lick at cleaner, faster production, on through to the tanks where a Lusol solution serves as a rust preventive for pressure testing their products.

Send for this FREE BOOK

"Lusol Gets to the Point" tells how to clean machines, what mixtures to use, and gives performance data. For a free copy, write on your company letterhead to: F. E. Anderson Oil Company, Inc., Box 215L Portland, Connecticut.

Case Histories of Lusol at work

A GEAR MAKER—"Never got more than 4 pieces per hob tooth with the old coolant. Put a Lusol solution in our gear hobbers and now we get as high as 22 pieces per hob tooth."

UNION COMPLAINED at too much smoke in a machine shop; insisted on new, powerful exhaust fans, which would have required a greatly expanded heating system. Lusol was offered as the solution, because there's no smoking when you're cutting with Lusol.

A TOOL MAKER—"I haven't found anything that works as well as Lusol on thread chasing and tapping of high-carbon steels."

AN OPERATOR on a Warner & Swasey lathe said, "I used to make at least three strokes in drilling a large, deep hole with our old coolant. Now I go all the way in one stroke with Lusol."

A GRINDER FOREMAN "Formerly rough-ground only 3 to 5 pieces on a 42" forging before the wheel needed redressing, so I told the salesman his wheels were no good. He suggested a change to Lusol, and now we grind more than 20 pieces with one dressing."

F. E. ANDERSON OIL COMPANY, INC., PORTLAND, CONN.

TALKING SHOP

Horseshoe

BOEING has put in a horseshoe-shaped final-assembly line at its Renton, Wash, plant, in sharp contrast to usual straight lines used in aircraft plants. In assembling the KC-97F *Stratofreighter* for the Air Force, the line doubles back on itself, permitting personnel to work without changing position. Parts are fed in from sub-assembly or outside contractors all along, as usual, from the outside of the U.

Poor Relations

A FRIEND told us recently of the industrial-relations man who had a very tough time with his boss. Seems the boss had a tendency to say what came into his mind, and when he got mad—which was frequently—what came into his mind was unprintable. Thus the industrial-relations man had good reason to insist that the boss make no statements in union negotiations until said statements were cleared by the IR man.

Current contract negotiations had been on for three days, with the IR man using tact and persuasion, but getting no cooperation from the opposite side. His boss had kept quiet, true to his promise, but was obviously close to the boiling point. Union demands were impossible, and any concession was met by new—and tougher—demands.

Suddenly the boss blew his top and told the union negotiators just what he thought of them and their ancestors, withdrew all concessions, and said they could take his original offer—or nothing. It was a very wrong and impolite thing to do. But —inside of 20 minutes, the new contract was agreed upon, and ten minutes later the IR man was looking for a new job.

Ex-exhibitor

A MACHINE-TOOL EXHIBITOR at a recent show was less than impressed with the quality of the attendance. To make his point, he told the story of one visitor who watched a machine tool running for a while, then turned to his companion with, "What are they pumping through there —milk?"

The friend was non-committal, but the exhibitor knows how to go along with a gag. "Sure," he said, "It's milk. All these machines are churning milk."

"Well," said the visitor, "I didn't know that. How much do you use?"

"Oh," said the exhibitor, "Quite a bit. Never figured it up, but we have men bringing in cans of it every night—all they can lay hands on. Haven't you noticed that milk prices just went up a cent?"

"So that's what caused it!" said the visitor. "That ain't fair to us local people. You ought to bring your own milk."

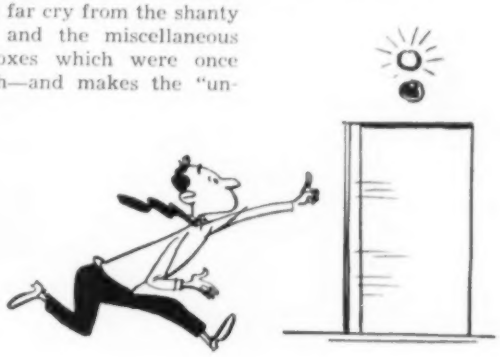
"Don't worry," said the exhibitor, "Next time I will. Our milk is better—more butter fat. But don't worry about it, the show ends tomorrow, and your milk price *should* go down again. As soon as I sell the butter I've churned, I'm going home, —and *stay* there."

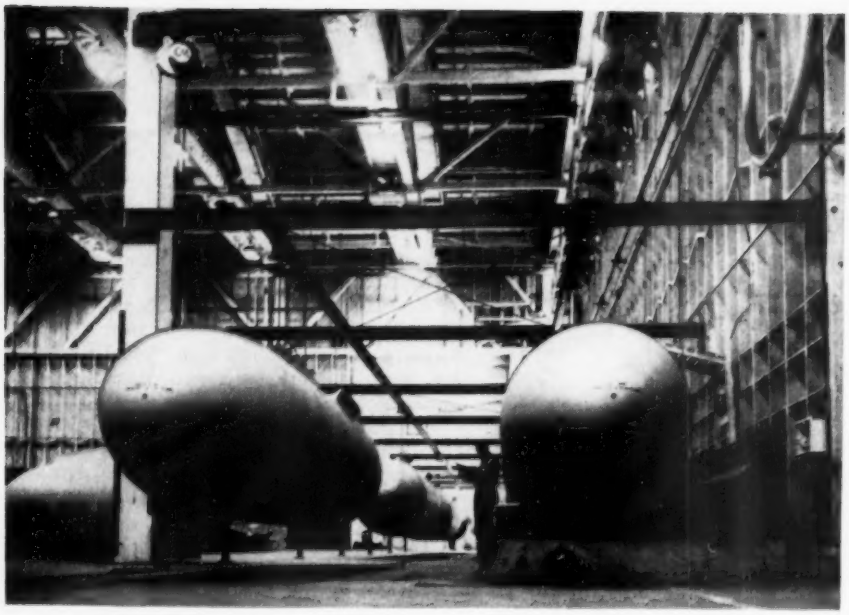
Going Up!

THE NEW Norton machine-tool plant has factory lockers and toilets in three areas on a mezzanine, with a capacity for 1250 men. Office cloakrooms and toilets, at the rear of the office, are on the ground floor. As a result, Norton has found it necessary to install two automatic passenger elevators to serve the mezzanine. . . . This is a far cry from the shanty "out back" and the miscellaneous drygoods boxes which were once good enough—and makes the "unnecessary trips" very inviting. We're reminded of the New England plant of the old days that had a semi-cylindrical door on the single-toilet room, so the door had to stick out when someone went in, and which, after three minutes or so, locked and rang an alarm bell in the front office.

Square Gear Plant

FAIRFIELD MFG CO, Lafayette, Ind, is a large, job-lot, heavy-gear plant, producing mostly heat-treated steel gears for construction and farm equipment in lots averaging 400. When the new plant was laid out two years ago, the first step was to replan each department for 25% increase in production and for maximum flexibility and efficiency. This was found to require just double the then floor space, both in plant and in office. Departmental layouts were coordinated into a single-floor building. Some modifications in departmental layouts were necessary, of course, but the result was a roughly square building, 400 x 420 ft, through which production would flow in a generally U-shaped course. Heat-treat and inspection are at the exit end of the U, grinding between the arms, because some gears must be ground before teeth are cut, and most of them ground or shaved afterward. Gear forgings are normalized, then spotted at the entrance to the far end of the U. They pass through machining and shaping operations along one arm, are toothed in the largest non-automotive Gleason setup in the US across the front of the plant, then go down the other arm to Heat-treat. Inspection and Packing, crossing the aisle to Grinding if necessary.





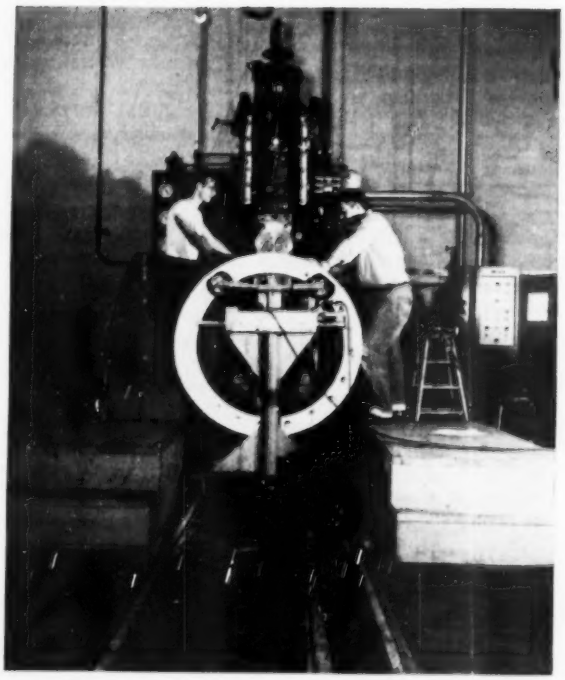
EXTERNAL FUEL TANKS for B-47 *Stratojets* get overhead-monorail treatment so spray-painting, air-drying, sanding, and inspecting can be done easily. All surfaces are accessible, and temporary storage while drying is easy

RYAN'S INTERMIXED CONVEYORS MOVE

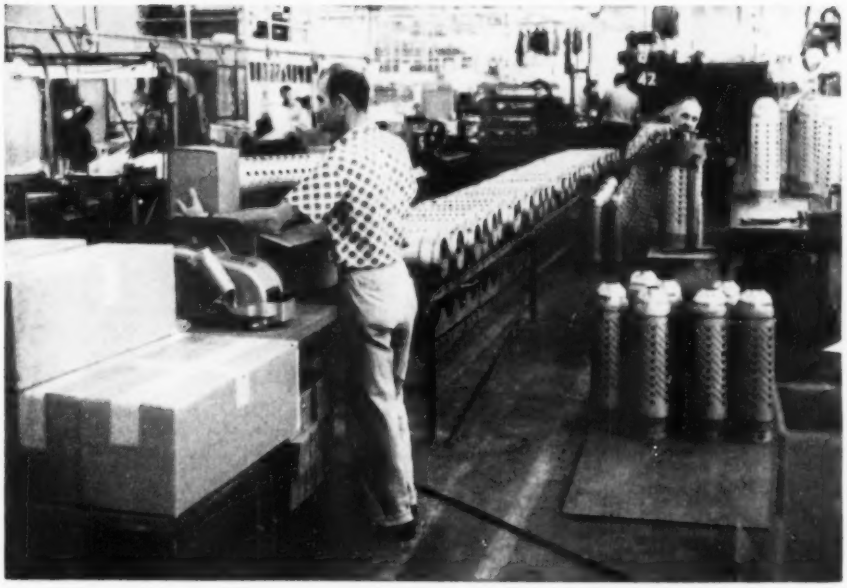
Three main items—airframes and fuel tanks, jet-engine parts, and exhaust systems—flow through Ryan Aeronautical Company's sheet-metal shops. By basing production plans on volume of order, size of parts, and fabricating methods required, Methods Engineering picks one or more of these general materials-handling techniques for the job:

1. **Stock boxes and pallets**
2. **Mobile dollies and special racks**
3. **Conveyors on floor tracks**
4. **Roller conveyors and monorails**
5. **Powered conveyors**
6. **Special handling devices**

Result is maximum utilization of machines and space, a necessity because it is impossible to foretell what new methods and routing may be required on future orders.



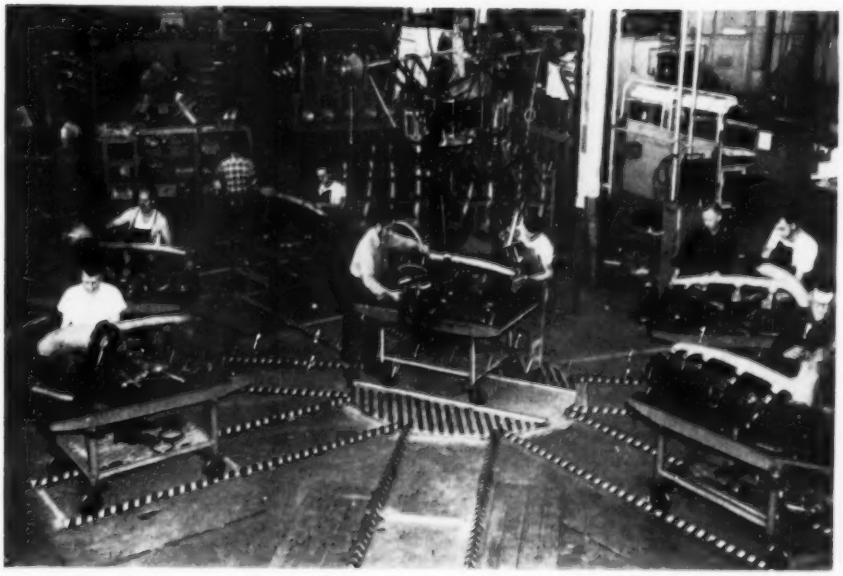
GAS TANKS are handled on wheeled carts at eight large spotwelding machines, making flow easy, positioning automatic (for height), and production faster. Carrier allows rapid indexing of tank during welding cycle because of four-wheel work support



INNER COMBUSTION CHAMBERS for J-47 jet engines are roller-conveyored during alignment, spot-welding, seam-welding, inspection, and boxing stages. Earlier stages are batch-handled, but rollers save time and manual effort here

JOB LOTS

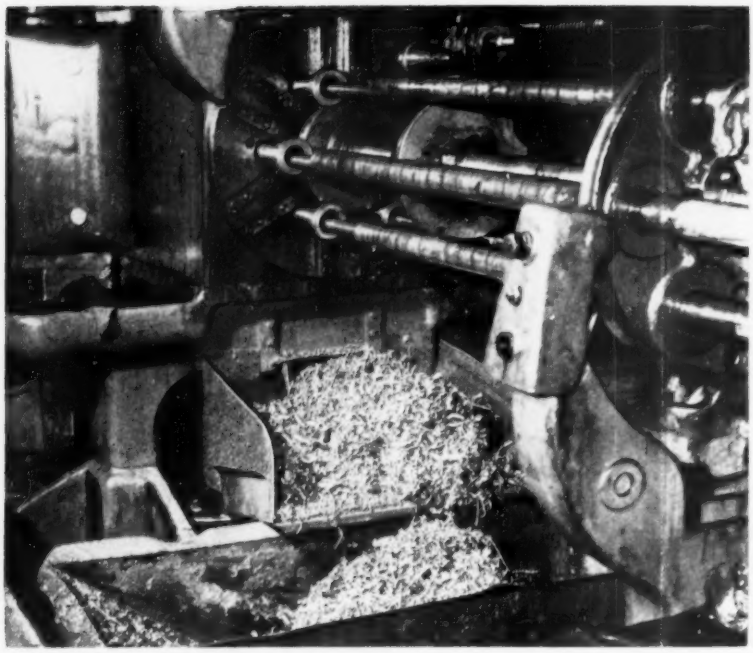
EXHAUST-SYSTEM PARTS for Patton-tank engine are moved by straight-line belt conveyor, possible because of small parts sizes and high volume. Fabricating equipment lines both edges of belt, which saves 40% in space



SEVEN BIG STAINLESS PARTS for internal-combustion-engine exhaust systems are assembled at tracked turntable, fed in from four fabricating areas on dollies. Tracks circle presses, welders, other machine tools

SPS MOVES CHIPS FOR PROFITS

By B W VAN DYKE, Plant Manager,
STANDARD PRESSED STEEL CO.,
Jenkintown, Pa



OILY STEEL CHIPS fall to apron conveyor under six-spindle automatic; are carried to waiting cart at back end of machine. Chip crew does raking, if necessary, and moves carts from machining departments to chip-disposal area

Feature of the 6-step reclaiming job is how machine sumps are refilled. All oil, reclaimed and new, goes to a clean-oil storage tank. Leading from this to various points on both production floors are pipe systems, terminated by hose reels and valves. When more oil is needed in a machine, the operator grabs a hose, moves it to the machine, and refills. This eliminates much trucking and barrel-handling that would otherwise be necessary; and results in further, though harder-to-evaluate, savings

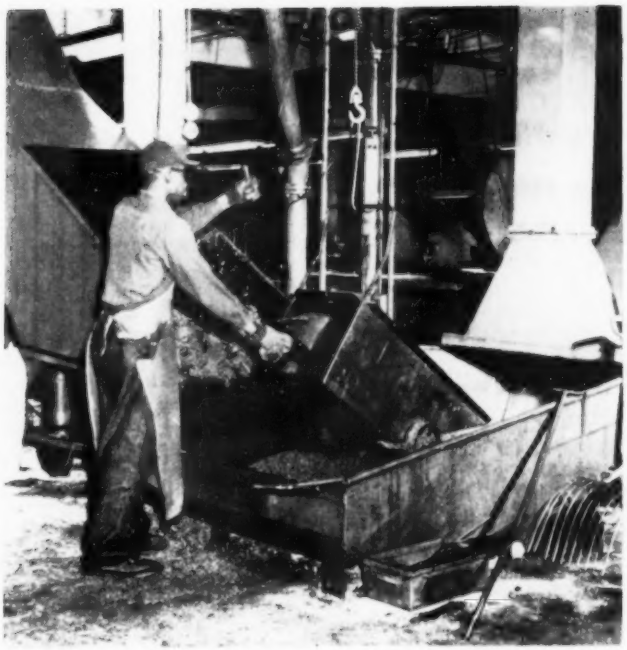
CASH returns from reclaimed cutting oils and cleaned chips can mount up to a fairly sizable figure, as proved by SPS since installation of a mechanized chip-disposal system. The project came about partly as a factor in the company's expansion program, which included revamping buildings under a single roof, and which allowed installation of crushing and conditioning equipment at a reasonable cost.

The complete system is all-inclusive, starting with oily chips at the machines, and ending with crushed chips in a gondola car, ready for rail shipment, and cleaned oil in the storage tank from which operators draw as required by the screw machines and automatics on the production floor. Small chip carts are filled from conveyors under the machines, pulled in trains by truck to the crusher, and dumped with the aid of an electric hoist. Movement of crushed ships from a drain hopper to the centrifuge, and from the centrifuge to the loading point in the pneumatic conveyor, is also handled by a hoist. But the remaining movements of chips and oil are done with pneumatic conveyors and pumping systems.

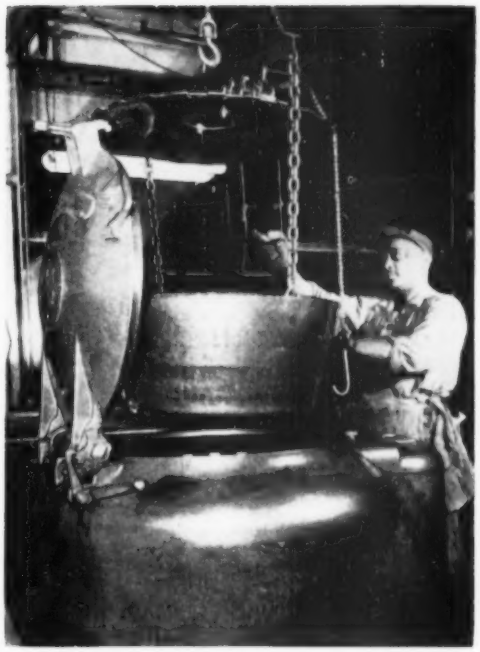
Advantages of the system are both direct and indirect:

1. Higher cash return on sale of crushed and cleaned chips to steel mill.
2. Economy in cutting oils because salvaging reduces purchases.
3. Cleaner shop conditions because of organized waste handling.
4. Economy of working force because all turning operations are served by an integrated chip-handling system and by specialist operators.
5. Less danger from dermatitis because oils are freshened during cleaning.
6. Car-loading time reduced from six man-days to 1 man-hr.
7. Better community relations because stream pollution from cutting oils is eliminated.

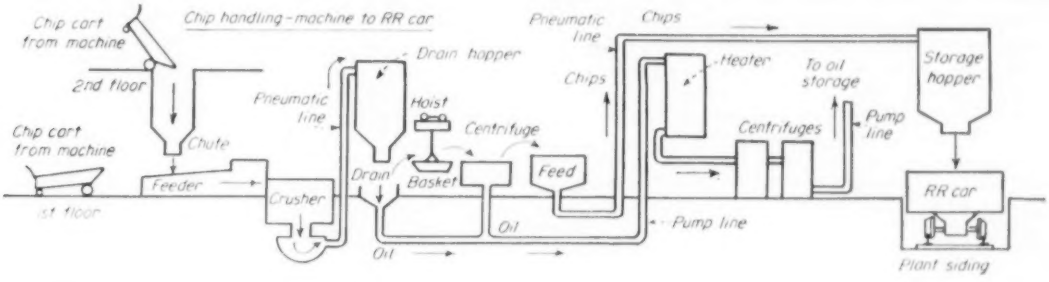
About 15 tons of chips are handled each day, which nets around $60 more from the sale of scrap than if it were oily and dirty. Cutting-oil reclamation is 15 to 20% more efficient by present methods over older systems.



CRUSHER IS FED BY HAND CARTS, also chute from cart-dumping hole in floor above. Chips are raked into crusher, then feed pneumatically to overhead hopper (out of picture to right, rear) where they drain for several hours



CENTRIFUGE IS LOADED by slipping basket under hopper, dumping hopper, then inserting basket in centrifuge. Spin at 3600 rpm takes about 10 min; extracts all recoverable oil not already drained from hopper into under-floor sump



DRY CHIPS ARE DUMPED INTO FEEDER for pneumatic conveyor that delivers them to storage hopper on second floor. Chips are now worth $4 per ton more than uncrushed, oily scrap

CHIPS ARE DUMPED FROM STORAGE HOPPER into gondola car on siding inside plant. Hopper holds 80 tons of scrap; fills car in 20 min. Chips are shipped from here to steel mill

News of Metalworking

Step-Up in Off-Shore Procurement Bolsters European Industry, Dollar Reserves

WASHINGTON—The US Off-Shore procurement Program is now hitting full stride. Contracts announced for fiscal 1953 to date amount to about $600 million and will probably exceed the $1 billion mark before the year is out. Chances are the program will let at least $1.5 billion in contracts next year.

Reason for the step-up in off-shore procurement is that Defense and State Department officials feel that buying of arms abroad is fast becoming the fastest, most efficient means of bolstering Western Europe's lagging reserves.

Triple Purpose

US arms aid contracts now being placed in Europe serve a triple purpose: (1) They help supply European forces with the quota of weapons paid for by the US under NATO, (2) They put European manufacturers to work supplying weapons for their own forces, and (3) they make the dollars the US pays for the weapons available to national treasuries. In this way, the funds spark European industrial production and at the same time bolster gold and dollar reserves of NATO nations.

Important New Policy

Two new developments in off-shore buying are important:

- The US is now contracting for completed weapons instead of buying spare parts and replacements.
- The US plans to turn off-shore buying into a major source of economic aid to Europe.

$550 Million for Aircraft

That's why the US signed contracts last month totaling some $281.5 million with France, the United Kingdom, the Netherlands and Belgium for purchase of military aircraft. Actually, the total European aircraft program comes to more than $550 million, other countries getting the rest.

Latest US-signed contracts call for $140 million for purchase of Hawker Hunter interceptors to be built by Hawker-Siddeley of England; $13 million for Hawker Seahawk Navy interceptors; $86.5 million for French-built Marcel Dassault Mystere Mark IV jet interceptors by Fiat of Italy. Also under contract to build Hawker Hunters are Dutch and Belgian firms.

How It Breaks Down

Here is a breakdown by country on contracts awarded by the Army, Navy and Air Force for fiscal 1953 (as of mid-April): Belgium $1,879,157, Denmark $1,418,360, France $172,198,246, Germany $642,785, Italy $86,002,667, Luxembourg $182,685, Netherlands $43,872,824, Norway $2,980,000, Portugal $18,074,690, United Kingdom $271,251,724. Total: $598,503,328.

Original policy on letting contracts to European manufacturers was to hold foreign firms to about 110% of US price plus cost of delivery to Europe. However that policy has largely been discarded due to wide variance in contract bid prices—sometimes as much as 125% difference between low and high bidders.

Selected Manufacturers

Today, the bulk of contracts is negotiated and procurement officers strive for the lowest price among selected manufacturers. Thus far, contracts have been let with hundreds of firms and spread out across the board through extensive subcontracting.

An Example

To illustrate: Microlambda Co of Naples was awarded contracts totalling more than $20 million for early-warning radar sets. Microlambda (part of an Italian government corporation set up to rebuild war-destroyed industry) is now operating under a licensing agreement with Raytheon Co of Waltham, Mass, which has guaranteed performance under the contracts. Microlambda has sub-contracted with 17 other Italian firms for components, and even gets some supplies from Germany and Switzerland.

The company, a prewar torpedo manufacturer, was destroyed completely in WWII and had to be started from scratch. Last year, Microlambda sent technicians to Raytheon to learn US methods while its plant was being rebuilt. On their return, the technicians trained former employees. The result: Microlambda has 400 skilled workers, has increased local wages 800%. Late last month it began volume production of radar sets.

Major Contracts

Not all contracts have been placed with an eye to rebuilding bombed-out industries. Britain's Royal Ordnance Works has over $100 million in orders for Centurion tanks and artillery shells. Thompson-Houston in Leicester, England, is turning out anti-aircraft radar. Britain's Birtley Co, Ltd, has a contract for $1 million worth of engineers' construction equipment.

Electrom, in suburban Paris, has a contract for electronics equipment, and Italy's Fiat is producing $9 million worth of J-35 jet engines. Finmeccanica of Italy is turning out F-84 airframes and spare parts totalling more than $100 million.

European Aircraft Designs

One thing is significant in the $550-million NATO aircraft program—all but a small part of the money will go into the manufacture of European-type aircraft. Up to now, NATO forces have relied on US plane types. This not only failed to build up the European aircraft industry and made the supply problem more difficult, it put an added strain on Europe's dollar reserves when it came to replacing worn-out equipment.

Helps US Air Force

The switch to British and French types cuts the dollar drain and adds spark to British and French military aircraft output. From the US viewpoint, this is favorable because it eases the flow of US spare parts to Europe. America's Air Force will thus not have to take a back seat while units of more immediate tactical importance are being built up.

Defense Department Lays Down New Policy on Procurement

WASHINGTON—How broad should the industrial base be when full production is achieved? Pentagon policy on the question is taking concrete form. Acting Defense Secretary Roger Kyes recently laid down a series of broad principles upon which selection of companies for defense contracts will be based. These can be interpreted in several ways and do not specifically state which firms will get contracts.

Industry Procurement Team

Nevertheless, Defense Department's format for future action is taking definite shape. For instance, only proven producers will be given defense production work and an experienced management team from industry will handle procurement in the future. This team will be made up of industrialists from the vice presidential level or above and will work directly under the Secretary of Defense in supervising all procurement.

The new Pentagon policy:

- Prime contractors must have the organization, management and technical ability to carry out the contract. Fly-by-night shops are absolutely out.
- The contractor must have the necessary plant and equipment, subject to "reasonable additions."
- The contracting company must rely solely on its own capital initially. Later, some government financing can come into the picture, but prime financial responsibility will be the firm's.
- Contractors must have an assured supply of skilled and unskilled labor on hand before the contract is awarded.
- Marginal producers for "easy to get" items are out. High-cost producers are allowable only where certain lines must be kept open, or where the item in question is hard to get or in short supply. In this category: machine tools, jet engines, electronic equipment, aircraft.
- Companies will get only such defense business as they can handle, i.e., dollar volume of defense contracts cannot exceed four times the plant's maximum civilian output.
- Exempt from this economic yardstick are machine tools and aircraft. To date, the Defense Department is still retaining the $500 million appropriation for the Vance Plan, and will continue to do so within the limits of available funds, Kyes says.
- Economy is the basic thought behind the Kyes Plan. That the broad base is expensive is unquestionable. But highly questionable were some of the procurement practices that existed under the broad base policy—awarding of contracts to plants in labor surplus areas because of Congressional pressure, and to marginal producers—with the result that too many contracts have gone to unqualified firms.

The Basic Idea

Basically, the Defense Department's new policy aims to get manufacturers back into their own fields. In addition, the Department will buy more "off-the-shelf" items instead of working out involved specifications for such items as military transport.

Lack of experience on the part of military men who have been responsible for procurement has been one of the greatest stumbling blocks to defense production, according to Mr Kyes, who claims they know little or nothing about industry.

Overnight sweeping changes are not to be expected as a result of the Wilson-Kyes plan. One reason: it costs more to cancel a contract than to let it run out. Another: a major retrenchment now would block two primary aims of the Defense Department—to maintain an adequate flow of materiel to the military, and at the same time to keep civilian economy in a healthy state.

Evaluating Contracts

Acting Secretary Kyes and his assistants are evaluating some 700 Defense Department purchase items and expect to unearth some production programs that fail to fulfil policy requirements.

Some contracts, as a result, will be terminated. Some production will be shifted, but most contracts will be allowed to run to completion. To date, no dividing line has been drawn between bona fide and questionable contractors. Each case will come up for individual consideration.

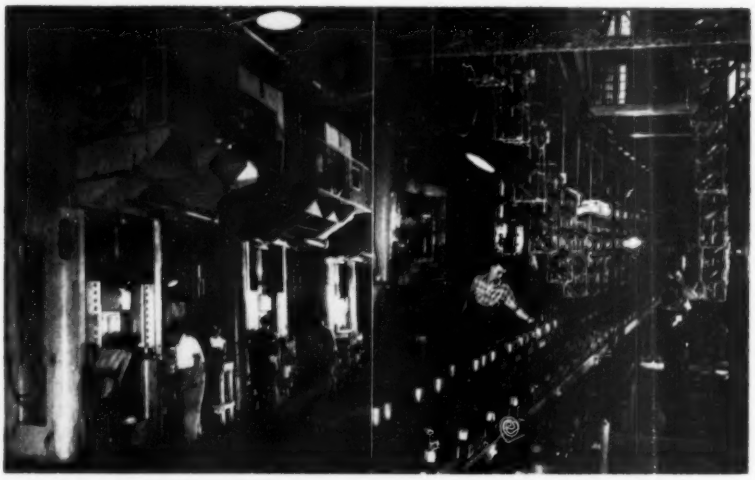
UNVEIL NEW ANTI-AIRCRAFT "SKYSWEEPER," claimed by military officials to be "undoubtedly the finest weapon of its type in the world," at AC Spark Plug Co's Flint, Mich, plant. Attending the unveiling ceremonies were top government and military officials and plant workers who for several months worked on its construction, knowing nothing about the overall project, only about their particular part of the work. Combining radar, computer and power units, the Skysweeper will find and track approaching aircraft 15 miles away, will bring them down at four-mile range, regardless of weather

SHORT RUNS ...

● Douglas Aircraft plans to produce a jet airliner in the near future. Several other aircraft companies may have similar plans but have not officially said so yet. US failure to catch the British in the jet airliner field is attributable to channeling of American jet production to the military. But if the Korean peace comes soon, the race will be on with a vengeance.

● A US metalworking firm has placed a $1 million order with Sweden's Svenska Metallverken for a completely automatic rod mill. Delivery date: early '54.

● ASM is sponsoring a high school and vocational teachers' course in Metals Technology at State Teachers' college, Oswego, N Y, June 15-27. First week—ferrous metals. Second week—non-ferrous.



COLD EXTRUDING STEEL SHELL CASES at Mullins Mfg Co's newly expanded Warren, Ohio, plant. Now in use for the first time commercially, Mullins' Koldflo process is being used to produce such items as torsion tubes for tandem axles, accumulators for prime movers. Left: metal is shaped at room temperature in hydraulic presses. Right: conveyors move 105mm shells and 81mm mortar shells between operations. Only machining required on shells is threading and placing of the rotating band on 105mm shells

NTDMA Outlines Defense Contracting Program at Washington Meeting

WASHINGTON—A program to speed up defense contracting and strengthen the tool and die industry was outlined here April 23-25 at the National Tool & Die Manufacturers' Association's annual Washington Planning Meeting.

NTDMA recommendations:

- That higher percentages be allowed for accelerated tax amortization on new facilities.
- That new machine tools primarily adapted for tool room use be allocated evenly between civilian and military users.
- That machine tools scheduled for delivery to a tool shop should not be subject to government diversion within 90 days of delivery date.
- That minimum volume for renegotiation of tool and die shops be boosted from $250,000 to a minimum of $500,000.

NTDMA also called for expiration of the Excess Profits Tax on June 30 and a balanced Federal budget. If the Excess Profits Tax is to be continued, NTDMA planners declare, the exemption should be increased to $100,000, because small tool shops have been severely penalized by the current exemption rate.

Members also stated that one of the industry's major problems is shortage of skilled labor.

NTDMA trustees reported "a marked decrease" in military tooling requirements during the last month and a "corresponding upsurge" in special tooling for producers of civilian goods. The military-civilian ratio for tool and die shop business has changed from 80% military—20% civilian to 40% military —60% civilian.

Civilian tooling requirements are particularly heavy in the Detroit, Cincinnati, Providence and Milwaukee areas, where military business is less than 25% of volume.

Automation

A high level of activity for designers and builders of special machinery was forecast by Fred W Gollbach, Ace-Central States Machine Tool Co, Detroit, president of NTDMA's Detroit Council.

Mr Gollbach reported increased interest on the part of large civilian goods manufacturers in automaticity for faster, cost reducing operations, pointing out Ford and Caterpillar as companies who have invested heavily in automation.

A similar theme was sounded by Philip R Marsilius, Producto Machine Co, Bridgeport, Conn, who reported that the drop in military tooling is being offset by increased tooling for new consumer products.

"Hard Selling" Ahead

Said Mr Marsilius, "New tooling orders flowing into contract tool and die shops indicate that automotive, appliance and business machine producers will be vying for the consumer dollar with products that are newer, better and cheaper. The productive capacity in consumer industries is now abundant and with the freeing of materials, there is only one road open for them—hard selling of modern design."

Special Tooling

J J Demuth of St Louis, past president of ASTE and tool and die consultant to NPA, warned government defense planners that the US will never be stronger than its ability to produce special tooling fast enough for defense end-products and called upon the government to "keep the special tooling industry healthy."

"Atomic energy, radar and jet engines are so complex we can't afford to build back for any length of time and hope to get into mass production quickly," Mr Demuth concluded "—without active tooling facilities, the biggest reserve of machine tools would be useless."

Rejected British Bid Touches Off Free Trade Vs "Buy American" Battle

WASHINGTON—The "Buy American" Act, signed in 1933 by President Hoover a few hours before he turned over the Presidency to Franklin D Roosevelt, is proving to be a thorn in the side of the new Administration and has put a severe strain on Anglo-American industrial relations.

The Act, an offshoot of depression panic, was a desperate effort to stem a rising tide of unemployment by replacing imports with "Made in USA" goods. In the early 30's, bitter international competition for scarce depression dollars strengthened the Act to a point where, economists now agree, it pulled the rug out from under world trade, prolonged and deepened world depression. Effects and offshoots of the Act have made themselves felt in many ways in recent years.

The English Electric Case

Last month, the free-trade-vs-Buy-American question came to a head. The Army had announced last year that bids would be accepted for generators and transformers for a power station at Chief Joseph Dam in Washington. Low bidder was English Electric Export & Trading Co, whose price was 11.4% under Westinghouse's on generators, 16.8% below Maloney Electric's on transformers. Acceptance of the English Electric bids would have saved the Army $913,788 and netted the Treasury $681,223 in tariffs. Total saving: $1,613,011.

Decision was put up to Defense Secretary Wilson, who suggested US companies be invited to meet English Electric's bid. He was told the procedure would be illegal. Wilson dodged the issue, put the question up to President Eisenhower. Then the pressure was put on from all sides. National Electrical Manufacturers Association urged rejection of the British bid. British Ambassador Sir Roger Makins asked Secretary of State Dulles to intervene in favor of English Electric.

The President finally decided against English Electric, despite protests of Dulles and Mutual Security Administrator Stassen, calling the Buy American Act "a bad law" but nevertheless a law.

Wilson then rejected all bids, US and British, on ground that technical specifications for the project needed reviewing.

This leaves the whole question up in the air. President Eisenhower is internationalist-minded and more or less committed to a free trade policy. Now, Administration critics claim the whole thing is a smokescreen designed to cover up a frank preference for domestic producers, pointing out that technical qualifications of all bids are thoroughly examined by Pentagon engineers before a bid is entertained and that cabinet discussions of the case touched exclusively on Buy American aspects, not technical.

Setting a Precedent?

It's still not clear whether the English Electric decision will set a precedent. Pentagon officials haven't received any new orders on how to deal with similar cases that might arise. But in this case, the effect of the decision is to give US producers a second chance to underbid a foreign producer—after having seen its bid.

SHORT RUNS ...

- Some 25,000 Canadian management and production men are expected to attend the Fourth Montreal Tool & Equipment Show November 9-13. To be held in conjunction with the Tool Show is the Montreal Materials Handling Show. US manufacturers are invited to exhibit and participate as a means of giving a sales assist to their Canadian distributors.

- Rochester Institute of Technology's eighth Machine Tool Familiarization Program for Sales and Service Personnel is scheduled for June 10-19. Course will operate from 8:30 am to 5:00 pm daily except Sundays, will be taught by machine tool experts and faculty members. Tuition for the course: $100.

- Battelle Institute's new technological information service is designed to help industry streamline literature searches on technical subjects. For a fee, Battelle staff researchers will prepare bibliographies and coding and classification systems on a specified technical subject, and when required will undertake development of information processing equipment.

REBUILDING MACHINE TOOLS AT BOEING, part of an extensive rebuilding program being carried out at the company's Wichita, Kansas, plant. Begun in 1948, the program calls for rebuilding of WWII machines at a rate of 17 a month. Last year, Boeing's machine maintenance department reworked 144 machines, keeping the average cost of each to 20% of 1942 list price

Business Items

Hamburg Machinery Co, dealers in new and used machine tools and parts, has been organized at 401 Broadway, NYC, by Al Hamburg, formerly of US Machinery & Motor Co.

Pratt & Whitney has relocated its Chicago office in larger quarters at 4649 W Fullerton Ave.

Detroit Harvester Co's Pioneer Pump Division has transferred its manufacturing operations to a new plant in Paris, Ky.

Norton Co has transferred New York City domestic sales offices for its Abrasive, Grinding Machine and Refractories Divisions to Green and North Sts, Teterboro, N J (in Behr-Manning's warehouse).

Lake Simcoe Industries, Ltd, new Canadian company owned by **Atwood Vacuum Machine Co** of Rockford, Ill., and **Bloxwich Lock & Stamping Co** of England will build a 20,000 sq ft plant at Sutton or Beaverton, Ont.

Leake Stamping Co, Monroe, Mich, has organized an entirely separate engineering organization, **Leake Engineering Co,** to provide idea-to-finished-product engineering in the metal stamping field.

Clarkson Engineering (Canada) Ltd has established a sales and service office for its line of chucks and milling cutters at 320 Ontario St, Toledo, Ohio.

Powdercraft Corp, a new corporation, will manufacture machine tools, bearings, filers, etc, by the powder metallurgy process in its plant at Columbia, S C.

Westinghouse Air Brake Co has purchased the earth-moving and tractor business of **R G LeTourneau, Inc,** including its international sales organization and its Peoria, Ill, and Toccoa, Ga, plants.

Monarch Machine Tool Co is moving its Chicago sales office to new and larger quarters at 6645 West North Ave, Oak Park, Ill.

Welling & Woodard, Inc, a new industrial consulting firm formed by Charles H Welling and George H Woodard, will have offices in New Canaan, Conn, Philadelphia and New York City.

New Convention Procedure Helps NSMPA Chart Policies

NEW YORK—Something new in convention procedure was tried out here April 20-23 at the 20th annual meeting of the National Screw Machine Products Association, held at the St Moritz-on-the-Park.

Some 100 executives met in groups of 15 or less at a general round table meeting to talk over subjects of top interest to the industry. At the conclusion of the group sessions, the chairman of each summarized the topics his group had discussed. From this, the entire convention voted on the subject in each group category that most interested them. These topics then came up for general discussion by the entire assemblage.

Purpose of the plan, according to NSMPA Executive Secretary Orrin B Werntz, is to chart the Association's work and policies during the next few years along lines of greatest interest to the membership.

Eight Topics Discussed

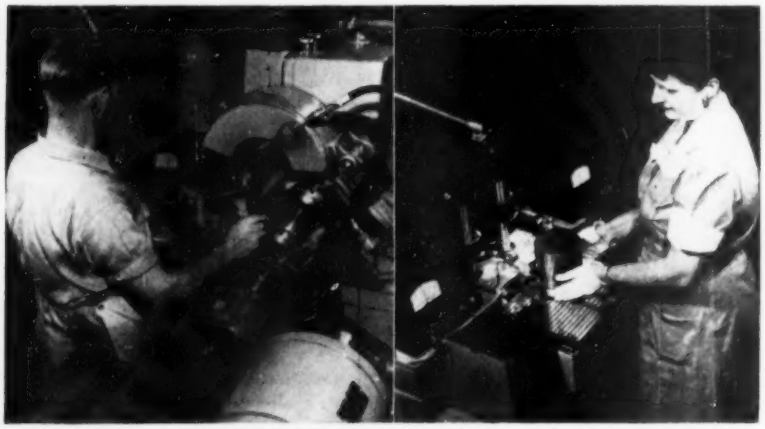
Subjects chosen in each of eight fields for discussion were: (1) *Customer Competition*—selling at a policy-making level, (2) *Selling Problems*—how to meet a buyers' market, (3) *Cutting Fluids*—standardizing on a minimum number of multi-purpose oils (4) *Cost Controls and Management Chart*—day-to-day operations control ratios, (5) *Second Operation Techniques*—how to obtain better second operation equipment for the industry, (6) *Union Negotiations and Industrial Relations*—general industrial relations policies, (7) *Machinery*—new developments in US machine tools, and (8) *Original Research*—machining of material.

Extensive Program

Opening day's program, Monday April 21, was devoted to committee meetings and executive sessions.

Highlight of the Tuesday, April 21, program was a luncheon talk by Dexter Keezer, director of Economics, McGraw-Hill Publishing Co, Inc, New York, on "Industry and Government in a New Climate." Following this, at a general session, John M Spangler, chairman, National Carbon Co, spoke on "Relations—Industrial, Public, Human."

Concluding Tuesday sessions was NSMPA's annual business meeting, climaxed by election of officers: president, A W Bonner, M B Fetcher Co, Detroit; vice president, William N Grass, M J Grass Screw Machine



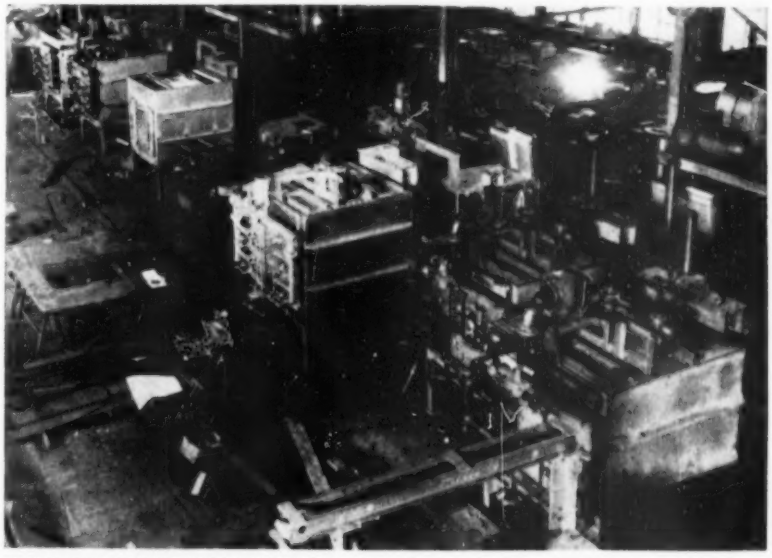
EXTRA-CLOSE TOLERANCES in the manufacture of roller bearings are achieved at Timken Roller Bearing Co through use of electronic gaging equipment. Left: centering parts on a chuck within 0.000020 runout. Work is first centered by eye as chuck rotates at 70 rpm. Next, operator brings tip of electronic indicator head in contact with OD, reads meter, adjusts position until piece is centered within 0.0002-in. Amplifier scale is then applied to reduce runout to 0.000020-in. or less. Right: checking roller bearings to 0.000075-in. maximum out-of-flat and runout. Bearing is axially loaded to a cylindrical weight, then rotated with tip of electronic indicator in contact with top of outer race. Out-of-flatness is shown on amplifier meter. Runout is checked by similar equipment at operator's right

Products, Buffalo; treasurer (re-elected), Charles D Hoyt, Jr, C D Hoyt Co, Inc, Mishawaka, Ind; and executive secretary, Orrin B Werntz.

Wednesday's general sessions were given over to round table and general discussion. Luncheon featured a film, "Closing the Sale."

General session on the concluding day, Thursday April 23, had as its first speaker A M Wilson of Liberty Mutual Insurance Co, Boston, who discussed NSMPA's insurance plan.

Allen W Rucker, Eddy-Rucker-Nickels Co, Cambridge, Mass., speaking on "Employee Incentives," told of NSMPA's experiments with the Rucker Share-of-Production Plan. Three companies, chosen from NSMPA membership, are currently trying out the plan on a one year basis. If successful, (the goal: to increase worker take-home pay at least 16%, profits proportionately) NSMPA will recommend the plan to its membership.



FURNACE PRODUCTION LINE. Six radiant-tube-fired heat-treating furnaces shown in various stages of construction at Surface Combustion Corp's Toledo plant, in one of the world's first furnace production lines

Tooling Near Completion As Canada's Defense Program Hits Stride

TORONTO—Canada's $2 billion-per-year defense production program is now in high gear, with tooling near completion for production of aircraft, weapons and ammunition, guided missiles, military and naval transport. Only small orders for machine tools are currently being placed by the Canadian government and machine tool builders' backlogs have tapered off noticeably.

Aircraft Production

Over a third of Canada's defense production is for aircraft. With tooling practically complete, US-designed Sabre jets are rolling off assembly lines at Canadair, Ltd, Montreal, for both Canadian and British air forces. Some have been sold to the US for use in Korea.

This summer, Canadair will produce Lockheed T-33 jet trainers for the RCAF, and Beechcraft T-36 twin-engine trainers for the US and Canada. At A V Roe Canada, Ltd, Toronto, the Canadian-designed CF-100 twin-engine jet fighter is in production for the RCAF here and overseas. Roe is also turning out Orenda jet engines to power CF-100's and Saber jets.

Several hundred smaller plants have also completed their tooling and are producing aircraft components. Several US and British manufacturers have opened branches in the Toronto area.

Other plants producing aircraft and engines for Canada and the US include: DeHavilland Aircraft of Canada—single-engine Beaver reconnaissance planes; Canadian Car & Foundry, Ltd—Harvard trainers; Rolls-Royce of Canada—Nene turbojets; Canadian Pratt & Whitney, Ltd—Wasp engines for Harvard trainers; and Canadian General Electric—overhaul and repair of J-47 turbojets.

Guided missiles are in production at government arsenals, which are also the principal producers of weapons and ammunition.

Other Defense Items

Ford, Chrysler and General Motors plants in southern Ontario are turning out jeeps, ¾-ton and 2½-ton trucks. These plants have reached peak production.

Largest factories producing radar and communications equipment include: Northern Electric, Canadian Marconi Co, RCA Victor, Rogers-Majestic, Canadian General Electric and Westinghouse.

Shipbuilding includes minesweepers, destroyer escorts. Such larger ships as aircraft carriers are being built in England for the Royal Canadian Navy. Most Canadian shipbuilding is in yards along the Atlantic coast and the St Lawrence river.

A large part of Canada's defense program has been for military bases, equipped with machine shops and overhaul bases. Some of the largest of these are still under construction, with machinery and equipment on order.

Few Shortages

Although the defense program in its early stages had some impact on civilian production and caused shortages in machine tools, materials and labor, today it has little effect insofar as shortages are concerned.

Consumer Goods Output at Peak

Production of consumer heavy goods is at an all-time peak, including automobiles, appliances, etc. Plant construction controls are off, ample supplies of steel are on hand, and commercial projects postponed since 1950 are now under way.

Only major shortage today is in the labor supply. This is partly due to the defense program, partly to military recruiting, and partly to the drain caused by development of such natural resources as uranium, oil, iron and strategic minerals. Increased immigration from Britain and Western Europe is helping to offset the shortage—last year some 175,000 immigrants settled in the industrial areas around Toronto and Montreal.

Metalworking Abroad

(By McGraw-Hill World News)

POLAND — More than a hundred new types of machinery will be produced here this year, including Soviet-designed welding equipment, heavy vertical lathes and machine tools for the manufacture of electric motor frames. Also to be made for the first time here: a collier with a fully-welded hull, electric locomotives and railroad rolling stock.

ITALY — Third International Engineering Salon will be held at Turin Sept 30-Oct 11. Held concurrently will be the International Congress of Manufacturers of Machinery.

ISRAEL — Modern water well-drilling equipment and parts to replace obsolete machinery are a necessity if Israel is to complete its 100-well program by December, US hydro advisor Walter Flannely states. Needed: at least five Cyclon 48's, drilling machine casings, "fishing" equipment.

ARGENTINA — Production of steel goods is on the upgrade here. The country's two principal plants, Industria Argentinos de Aceros SA's works at Rosario and Villa Constitucion, produced 111,529 tons of steel products in the last fiscal year, 64% of estimated capacity.

GERMANY — Largest postwar machinery exhibit, occupying seven of the ten halls at the Hanover Technical Fair, April 26-May 5, drew exhibitors from all over Europe, as well as Germany. Not represented at the Fair, however, were machine tool builders.

MEXICO — Newest developments here: Willys-Overland has opened an assembly plant on the outskirts of Mexico City for its complete line of cars, jeeps, etc . . . The government has ruled no textile machinery can be installed without its approval. Reason: to make sure only the latest and best machinery will be used to replace obsolete models currently in use . . . Continental Machines, Inc. of Minneapolis, is already making some small tools at its Mexican subsidiary, will make and export hardware goods to the US—a reversal of the usual US-to-Mexico flow of durable goods.

CAPITOL PUNISHMENT

The kind of experience facing a neophyte from industry on his first day in a Washington agency was outlined by Donald M Pattison, VP, Warner & Swasey Co and former director of the Metalworking Equipment Division, NPA, at AMTDA's recent spring meeting. Here it is:

We meet an old friend. He's been working in one of the 40 Emergency Defense offices for a week. Keeping a diary. Showed us his notes on his first day. (To protect him we've changed names.)

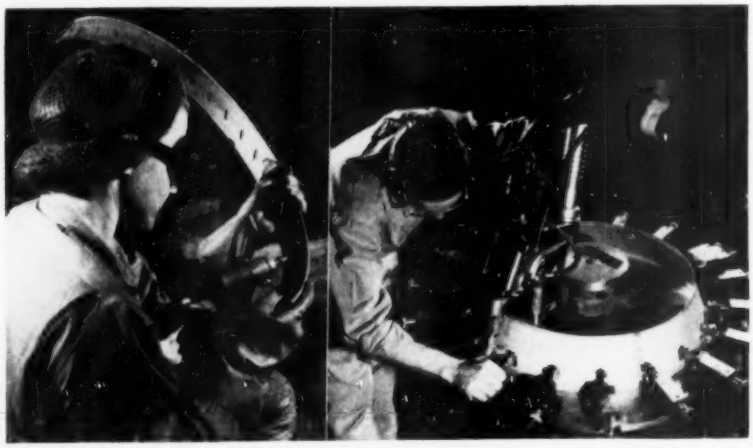
"Was introduced to boss. Section chief named Frobisher. Big, furtive guy. Didn't look up. Turned me over to assistant named Washlipp or something. Washlipp took me down corridor. Turned me over to girl named Stella. She took me up corridor to Personnel. Told man my name. Sent me to Mr. Chapfallen. Something like that. Mr. Chapfallen out. Guy named something I didn't catch took me down corridor. Introduced me to Section Chief Frobisher. Didn't look up. Turned me over to guy named Joe. Took me up corridor. Asked me if I was from Nebraska. Told him no. Asked me where in Nebraska. Said Omaha. Never been there, but what the hell.

Asked me if I knew Congressman somebody. Didn't catch name. I said sure. Told me another guy had my desk but was leaving tomorrow. Introduced me to a girl named Edith. Said only reason he did it was so I'd know her. Warned me not to tell her anything because she was stool pigeon. Thanked him. Swell-looking dame.

He suggested I spend rest of day looking around and asked if I had ash tray. Said I hadn't. He said put in requisition but never leave ash tray on desk after work if I ever wanted to see it again. Lock it up. Thanked him. Said more than 600 ash trays missing in two months. I said gee. Went to lunch.

After lunch stopped at Personnel again. Took my name. Turned me over to kid named Sam. Introduced me to Section Boss Frobisher. Didn't look up. Turned me over to Washlipp. Said he was glad to meet me. Took me down corridor. Saw Edith. Waved but didn't speak. Went to hotel. Bought ash tray. Go in tomorrow to find out what am supposed to do . . ."

(That's all except that next morning, ash tray in pocket, he was introduced to Mr. Frobisher who looked up, shook hands, said he was glad to meet him and took him personally to his desk. Guy he was replacing was gone. So was desk.)



FABRICATING TURBOJETS AT WESTINGHOUSE, Kansas City, Mo, plant. Left: grinding of radii in the ends of vane slots in jet engine compressor diaphragm shrouds requires a steady hand. Airfoil-shaped slots are punched in the section after it is formed on stretch-forming tool. Air-driven rotary files, spinning at 75,000 rpm bite out a tiny radius at end of each slot so vanes will fit snugly against shroud before welding. Right: positioning jig holds brackets in location for spot welding to top cone of outer housing of turbojet's outer casing.

Dull Tools Cut Aluminum Strength, Tests by Harvey Engineers Show

TORRENCE, CALIF—Importance of good practice in machining heat-treated aluminum alloys to the strength and quality of finished products has been re-emphasized in tests conducted by engineers at Harvey Machine Co, Inc. The tests showed that serious losses in tensile and yield strengths occur as a result of overheating when machining tools become dull.

Significance is attached to the findings in view of the practical difficulties involved in exercising technical supervision over all machining operations, and by the absence of any indications to inspectors that weaknesses resulting from overheating exist.

In tests of factors which can produce variations in mechanical properties of machined aluminum alloys, a series of standard flat tensile specimens was taken from alloy 75S-T6 extruded shapes. These flats were prepared by milling one set with a sharp, well-designed cutter, and a duplicate set with a dull cutter with insufficient clearance angle. Specimens to be compared were taken adjacent to each other so that variables other than temperatures during machining would be minimized.

In testing four sets of duplicate specimens of alloy 75S-T6, reductions of as much as 14.9% in tensile strength and 16.4% in yield strength were found (Table I).

When these strength characteristics were compared with those of similar specimens which had been submitted to measured furnace temperatures, it became apparent that temperatures reached during machining with the dull cutter were in excess of 500 F for a period of approximately 2 min. Had this temperature been maintained for as long as 5 min (as could happen in a heavy milling cut) the tensile strength would have been lowered by approximately 20,000 psi.

In a continuation of the study, tests were made of specimens of alloy 24S-T4, prepared in a similar manner. With this alloy the maximum reduction in tensile strength from overheating with the dull cutter was 8%, and the maximum reduction in yield strength was 31.6% (Table II).

In both cases, the overheating had no appreciable or predictable effect upon elongation characteristics.

These results indicate that otherwise inexplicable weaknesses in machined heat-treated aluminum alloys may be the result of high temperatures in machining. Adequate coolant and sharp, well-designed tools are imperative for uniform strength characteristics.

Table I—TESTS OF DUPLICATE MILLED SPECIMENS OF 75S-T6

TENSILE STRENGTH, psi			YIELD STRENGTH, psi			ELONGATION % in 2 in.	
Sharp cutter	Dull cutter	Percent reduction	Sharp cutter	Dull cutter	Percent reduction	Sharp cutter	Dull cutter
90,000	82,000	8.9	80,000	70,000	12.5	12.0	10.0
80,000	78,000	11.4	80,000	67,000	16.2	11.0	10.0
92,800	79,000	14.9	82,500	69,000	16.4	10.0	12.0
86,300	82,000	5.0	77,700	69,000	11.2	9.5	8.5
Average reduction		10.1			14.1		

Table II—TESTS OF DUPLICATE MILLED SPECIMENS OF 24S-T4

TENSILE STRENGTH, psi			YIELD STRENGTH, psi			ELONGATION % in 2 in.	
Sharp cutter	Dull cutter	Percent reduction	Sharp cutter	Dull cutter	Percent reduction	Sharp cutter	Dull cutter
63,000	60,000	4.8	46,750	32,000	31.6	18.0	15.0
62,750	60,100	4.2	47,250	37,000	21.7	18.0	14.0
65,500	62,000	5.3	50,000	41,000	18.0	17.0	17.5
63,600	58,500	8.0	45,800	40,500	11.6	20.0	19.0
Average reduction		5.6			20.7		

Plant Expansion

Federal Electric Products Co is completing construction of a 45,000 sq ft plant in Los Angeles. Production starts this month.

Minneapolis-Moline Regulator Co has started work on a 220,000 sq ft plant at Gardena, Calif, for making furnace controls.

Bart Mfg Corp, Belleville, N J, has completed a 12,000 sq ft addition to its plant. The addition will be used for precision electroplating of industrial equipment for the AEC.

Akron Presform Mold Co has increased manufacturing facilities at its Cuyahoga Falls, Ohio, plant, by adding a two-story building at one end of the plant and a new wing at the other end. Total added space 35,000 sq ft.

Parker Stamp Works, Inc, is constructing an addition to its Hartford, Conn, plant that is expected to up production space 46%.

Bridgeport Brass Co, Bridgeport, Conn, is building a $4.5 million brass and copper tube processing plant on the Housatonic river.

Excel Machine Co has moved from Williamsville, N Y, to a new and larger plant at 11075 Main St, Clarence, N Y.

General Motors Corp is spending $500,000 to expand its warehouse facilities for Plant No. 2 in Oakland, Calif.

G M Giannini Co, Pasadena, Calif, has started construction on a 24,000 sq ft instrument assembly plant in that city.

Pastushin Industries, Inc. has moved to a new and larger plant at 501 N Prairie Ave, Hawthorne, Calif, where it will manufacture aircraft hardware.

Seaboard Screw Corp, West Warwick, R I, has completed a $40,000 expansion that will increase its plant capacity 90%.

Adamas Carbide Corp is constructing a $1 million plant for production of tungsten carbide tools, tool tips, dies and wear parts at Kenilworth, N J.

Diamond Machine Tool Co is completing construction of a 55,000 sq ft plant at Pico, Calif.

Carl J Demrick

William M Campbell

Gilbert L Holt

T H Herbst

Names in the News

Carl J Demrick has been appointed to the newly created post of general manufacturing manager of the Plymouth Division of Chrysler Corp, Detroit. Mr Demrick has been staff master mechanic at Chrysler since January. During World War II, he served as foreman of the Chrysler Bofors Gun Project, later becoming staff master mechanic at Chrysler's Lynch Road plant.

William M Campbell has been named manager of Hyster Co's Peoria, Ill, division, succeeding **Theron Howard,** who is retiring. He is succeeded as office manager at Peoria by **Ronald B Bengston,** formerly chief accountant.

Howard D Neal, for the last 14 months general manager of the Aerol Co, Inc, Los Angeles, has been named vice president and general manager of the company.

Robert J Steele has been named general superintendent of the Carbide Division, and **John D Knox,** superintendent of the Powdered Metals Division of Firth Sterling, Inc, Pittsburgh.

F H Evans, formerly assistant to the manager of manufacturing, General Electric Meter and Instrument Department, has been named manager of manufacturing for the company's Welding Department.

John W Craig has resigned as vice president of Avco Mfg Corp and general manager of its Crosley Division, to become president of Aluminum Industries, Inc, Cincinnati, where he will also be general manager of the company's two plants.

Gilbert L Holt has been appointed works manager for the Berwick, Pa, plant of American Car & Foundry Co. Mr Holt was formerly Berwick's production manager.

Robert S Sweeney, formerly vice president and treasurer of the Watson-Stillman Co, has joined American Machine & Foundry Co as vice president and general manager of its Leland Electric Division, Dayton, Ohio. Also named to a new post is **Rex D Marsh,** formerly president and director of Bowser, Inc's Canadian subsidiary, to be Leland sales manager.

John D Thompson, formerly vice president in charge of operations for John A Roebling's Sons, has been elected executive vice president of Henry Disston & Sons, Inc, Philadelphia.

Richard Nelson, formerly Boeing Airplane Co project engineer on pilotless interceptors at Seattle, has been appointed production manager for the firm's new pilotless aircraft division.

William W Taylor, formerly of Cincinnati Milling Machine Co, has been appointed vice president in charge of all manufacturing operations for OPW Corp, Cincinnati.

Carl L Ipsen has retired as chief consultant for General Electric Co's Heating Department to become executive vice president of the Industrial Furnace Manufacturers' Association, Washington. Mr Ipsen was until recently on leave from G-E as chief of the Industrial Heating Equipment Section, NPA.

T H Herbst has been appointed factory manager for United Tube Corporation of Ohio, Cleveland. Before joining United, he was in charge of inert gas welding development at Linde Air Products Company.

Thomas R Moore, General Dyestuff Corp, was elected president of the Metal Powder Association at its annual meeting. Other officers: **Ernest H Klein,** New Jersey Zinc Sales Co, chairman of the board; **Robert L Ziegfeld,** acting secretary-treasurer (re-elected).

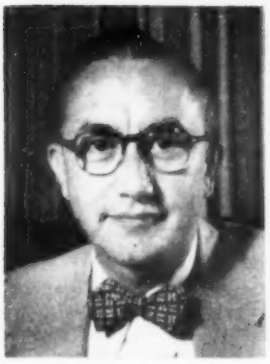
W A Mattie has been appointed general manager of Eaton Mfg Co's Heater Division, Cleveland, succeeding the late **C C Bradford.** Mr Mattie was division general manager.

R S Bright has been named general manager of Chrysler Corp's Indianapolis plant. With Chrysler for 16 years, Mr Bright has been general manager of tank engine building at Chrysler's Michoud Ordnance plant, New Orleans. Also named to an executive position by Chrysler is **Charles F Vandekerck,** to staff master mechanic. Mr Vandekerck was formerly master mechanic at Chrysler's Delaware Tank Plant.

Robert C Overstreet, vice president and secretary of Tinnerman Products, Inc, and **John E Potter,** controller, were recently elected executive vice president and secretary, respectively.

Robert E Beetham has been appointed works manager of Amperex Electronic Corp's Hicksville plant.

N George Belury, who will continue as president of American Brake Shoe Co's Engineered Casting Division, has been elected a vice president of Brake Shoe.



Fred W Gollbach

John Allmon

Charles A Simmons, Sr

Charles A Simmons, Jr

John Allmon, president of Central States Engineering Corp, Detroit metalworking equipment design firm, and **Fred W Gollbach,** president of Ace Tool & Die Co, Detroit, have formed Ace-Central States Machine Tool Co, Detroit. Mr Allmon will be president and Mr Gollbach board chairman of the new firm, which will design and build machinery and supporting tooling for automatic manufacturing operations. Otherwise, Central States and Ace Tool & Die will continue to operate as separate organizations.

Oliver G Dumont has been named superintendent of electrical departments at Allis-Chalmers Mfg Co's Norwood, Ohio, works, succeeding **G C Vogel,** who recently became general superintendent.

David A Blevins has been named production engineering supervisor for Electric Regulator Corp. He was formerly chief engineer of Shank Metal Products Co.

Donald M Mallory has been appointed director of engineering, and **Wayne M Biklen** manager of quality control for American Safety Razor Corp, Brooklyn, NY.

James V Burrell has been named Michigan district sales representative for Electric Furnace Co.

Samuel A Mencacci has been named assistant sales manager of Food Machinery & Chemical Corp's Canning Machinery Division's Western operation. He is succeeded as chief sales engineer by William B Bangerter.

John R Howell and **Robert D Dudley** have been appointed regional sales managers for Sterling Electric Motors, Inc, Los Angeles. Mr Howell will represent the company in the West, Mr Dudley in the Midwest.

Major Louis G Burns has completed his assignment with the Air Research and Development Command, Wright-Patterson Air Force Base, Ohio, and has joined Chandler-Evans, Division Niles-Bement-Pond Co, West Hartford, Conn, as chief pump engineer.

Lewis F Luckenbill has been named sales representative for Union Tool Corp, Warsaw, Ind, in Michigan, Minnesota, Wisconsin, Illinois, Missouri and western Indiana.

F B Pinzel has been appointed assistant general sales manager for H K Porter Co, Inc's Buffalo Steel Division, Tonawanda, N Y.

N A Lamberti, purchasing agent for McCulloch Motors Corp, has been named director of materials.

Joseph E Mulheim, formerly assistant manager of aviation engineering, Westinghouse Electric Corp, has joined Jack & Heintz, Cleveland, as chief engineer.

Edward J Horkey, formerly Chief technical engineer for North American Aviation, Inc, has joined Pastushin Aviation Corp, Los Angeles, as vice president in charge of engineering.

Borje Rosaen, who will continue as sales manager for New York Air Brake Co's Dudco Division, has also been named sales manager of the Company's Hydreco Division.

W H Rowand, chief engineer of Babcock & Wilcox Co's Boiler Division, has been elected a vice president of the company.

Price Davis of Milwaukee has been appointed manufacturers' representative for Horton Chuck, Division of E Horton & Son Co, in Wisconsin.

Charles A Simmons, Sr, who founded Simmons Machine Tool Co, Albany, NY, in 1910, was recently elected chairman of the board. He is succeeded as president by his son, **Charles A Simmons, Jr,** who has been with the firm 20 years, since he was 16, and who moves up from vice president and general manager.

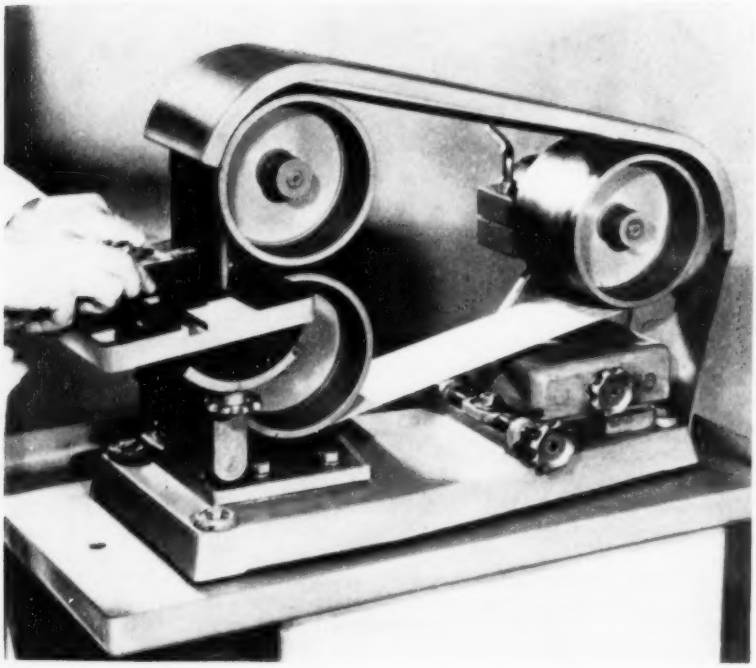
OBITUARIES

Frank Purnell, 66, chairman of the board of Youngstown Sheet & Tube Co, died April 19 in Youngstown, Ohio. Son of a millworker, Mr Purnell became a hall boy with Youngstown Sheet & Tube in 1902, working his way up to the firm's presidency in 1930. He served as assistant director of steel supply under Bernard Baruch in World War I, then went with Consolidated Steel Export Corp and Bethlehem Steel Co before rejoining Youngstown in 1923.

Sven Wingquist, 76, founder of Sweden's giant ball-bearing firm, SKF, and inventor of the Swedish spherical ball bearing, died April 17 at Ulricehamm, Sweden. While managing director of SKF, Mr Wingquist persuaded the Swedish government to develop a third-rate arms factory —today one of the great names in armament production — Bofors, a firm he also headed for many years. Mr Wingquist was also director of Volvo Co, automobile manufacturing firm; Nydqvist & Holm, locomotive manufacturers, and the Swedish Aviation Engine Co.

Oscar C Schmitt, president and director of Emerson Electric Manufacturing Co, St Louis, died of a heart attack while at work on April 21. Mr Schmitt, who joined Emerson Electric as an office worker in 1910, became vice president in 1936, a director in 1938, executive vice president in 1940, and succeeded W Stuart Symington as president in 1945.

New Shop Equipment



3M—Hammond Abrasive-Belt Machine Finish Grinds Carbide Tools

An abrasive-belt machine for finish grinding carbide tools has been developed jointly by Minnesota Mining and Manufacturing Co and Hammond Machinery Builders. Carbide belt finisher Model 454 is manufactured and sold by Hammond.

The method is claimed to simplify the job of carbide tool sharpening and to reduce costs, yet produce a better-than-average tool edge. A two step sharpening technique is employed: (1) rough grinding on a standard 60-grit silicon-carbide wheel, and (2) finishing the sides and top of the carbide tip on the belt machine with a Tri-M-Ite Resinite abrasive belt ranging from 60 to 150 grit, depending on the edge required.

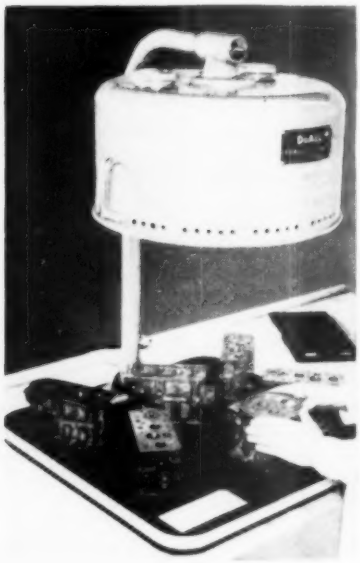
A 1/16-in.-wide land is finished from the cutting edge down. This land is at the desired clearance angle and is flat, not hollow ground. It is also possible to finish the flat top of the tool.

Similar in design to Hammond diamond-wheel grinders, the machine has the same type of calibrated tilting table. The table swings out of the way for belt replacement. The machine has a tungsten-carbide faced platen for accurate flat surface finishing, a 10x7½-in. table with side supports for sharpening angular tools, a positive belt tensioning device, and angular and lateral belt tracking adjustment. The machine is powered by a ½-hp motor, single- or three-phase for voltages from 110 to 440.

The abrasive belt is 4x54 in. with a special hard paper backing and a silicon-carbide abrasive. The belt has the 3M "uni-caliper" splice said to provide smoother operation. A stick coolant has been developed for this operation.

Intended to supplement or replace diamond wheels in sharpening carbide tools, the belt machine can also be used for sharpening similar tools made from high-speed steel and other alloys, and for other sharpening, chamfering, and surfacing operations. It is designed for wet grinding with conventional waterproof abrasive belts.

Minnesota Mining and Manufacturing Co, 900 Fauquier St, St Paul, Minn; and Hammond Machinery Builders, Kalamazoo, Mich



Light Generator Checks Parts For Flatness, Finish, and Size

Monolight is a 20-in. monochromatic light generator designed to facilitate optical flat checks for flatness, finish, and size on large lapped surfaces or numbers of smaller parts.

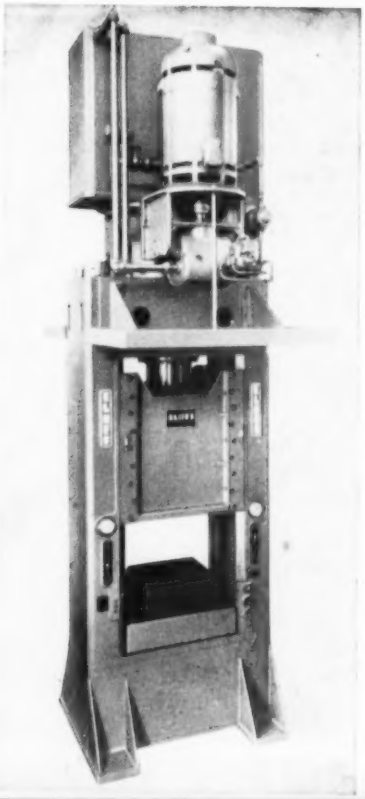
The 24-in. work height capacity permits parts of considerable thickness to be inspected; 30x30-in. worktable accommodates a large quantity of parts, and groups to be checked with optical flats can be allowed to normalize right at the light source, eliminating extra handling.

Head of the instrument can be swung in a 160° arc from side to side permitting additional quantities of parts to be checked on tables nearby.

Monochromatic light of 20-ft-candle intensity is generated by mercury vapor, with better fringe line definition and less glare; ceramic diffuser eliminates pattern normally created by the light generating tube.

DoAll Co, Des Plaines, Ill

Materials and Parts



Elmes Pipeless Hydraulic Press Cold Draws Artillery Projectiles

Hydraulic drawing and forming press designed for cold drawing and nosing artillery projectiles has 500-ton capacity. Die space is smaller than standard, the pressure developed in this process requiring less area.

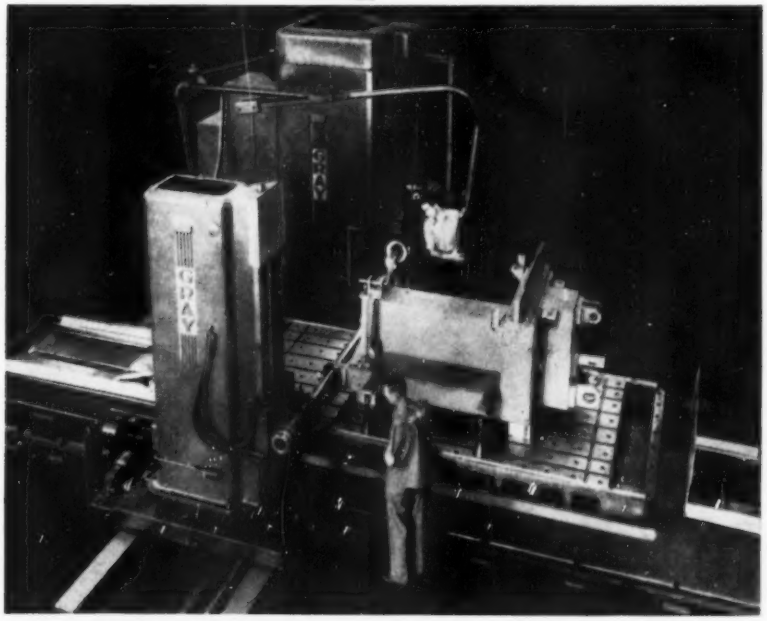
The press is part of a shell-forging process said to represent an efficient compromise between hot forging and cold extrusion.

There is no piping in the main hydraulic circuit. All high pressure fluid is conducted through short, direct passages drilled in the structural parts. This is said to provide smooth, shockless operation with low maintenance costs.

American Steel Foundries, Elmes Engineering Div, 1150-A Tennessee Ave, Cincinnati 29, Ohio

Mitchell Air-Strip is available in interlocking, grease-resistant 24-in. blocks. Single mats and sections, or continuous runner in waffle or solid pattern can be made up to accommodate any floor area.

R L Mitchell Rubber Co, 2114 San Fernando Rd, Los Angeles, Calif.



PLANER TYPE HORIZONTAL BORING MACHINE, 6-in. size, built for Boeing to make master gages. Table will take 12x6x6 ft. The 6-in. spindle is made of nitralloy. Precision indexing is possible to 0.00025 in. — *The G A Gray Co, Dept 1, Cincinnati 7, Ohio*

...INCLUDING

Diaphragm chuck is air operated with booster mechanism to increase torque factor ... page 216

Free-machining screw steel produced by open-hearth process is said to have increased uniformity ... page 218

Eccentric wheel operation provided on cutoff machine permits smooth, fast cuts ... page 222

Jig mill controls vertical and transverse motions with optical system ... page 224

Dial-feed tables with positive lock designed so top plate cannot override and lose index page 226

Two brakes in motor-reducer combination provide fluid-cushioned braking and positive holding after a stop ... page 228

Parts washer has skim-off operation to eliminate secondary rinsing ... page 230

Rotary planer equipped with hydraulic feed handles structural members and castings page 234

...and in May 25

Automatic drilling and tapping machine uses hydraulically controlled air power

Extrusion press for aluminum loads billet and dummy block on single stroke of ram.

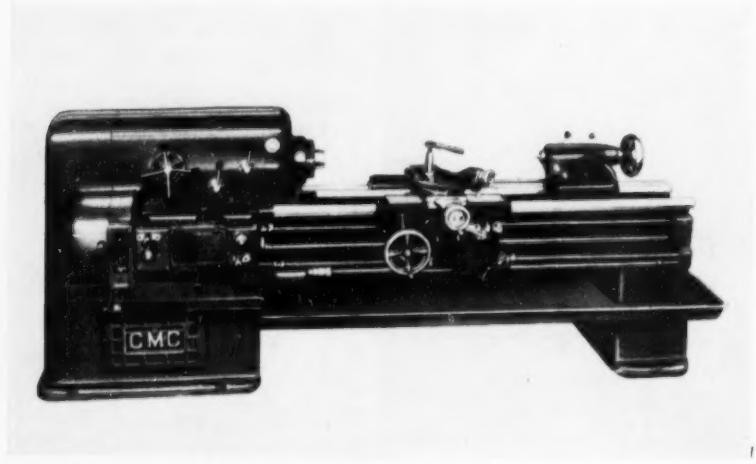
Wells Bandsaw is Equipped With High-Speed Steel Blade

Wells Model 800 horizontal bandsaw is equipped with the Milford Rezistor high-speed steel bandsaw blade.

Unit has a heavy-duty counter-balance frame and beam, band wheels providing for use of 1-in.-wide blades, a new constant-load blade tensioning device, and synchronized-speed cleaning brush for blades.

Although developed especially for use with the high-speed steel blade, Model 800 can be used effectively with standard carbon steel blades. Machine capacity is 8-in. dia.

Wells Manufacturing Corp, 505 Roosevelt Rd, Three Rivers, Mich



CMC Toolroom Lathe Available in 16- and 18-in. Size

Sixteen selective spindle speeds, using 15 change gears, and 66 feeds are provided in the CMC precision toolroom lathe. The bed is of nickel semi-steel.

Head is equipped with anti-friction bearings. Change gears are forged nickel steel, heat-treated and shaved. Saddle and compound rest are of nickel semi-steel with intermediate cross slide for taper turning. The apron is a single double-wall casting with built-in oil pump and grouped controls.

Design provides separate leadscrew and feed rod, clutch control, and leadscrew reverse with automatic stop, to feed in either direction, and a micrometer stop for length of cut. A safety interlock prevents feed and thread engagement together.

Imported by Pitnam Industrial Products Co, Div of Cement and General Development Corp, 608 Fifth Ave, New York 20, NY

Skylift Fork Lift Trucks in 1000- to 4000-lb Class

Standard Skylift CF line of electric fork lift trucks has been introduced in the 1000- to 4000-lb load class.

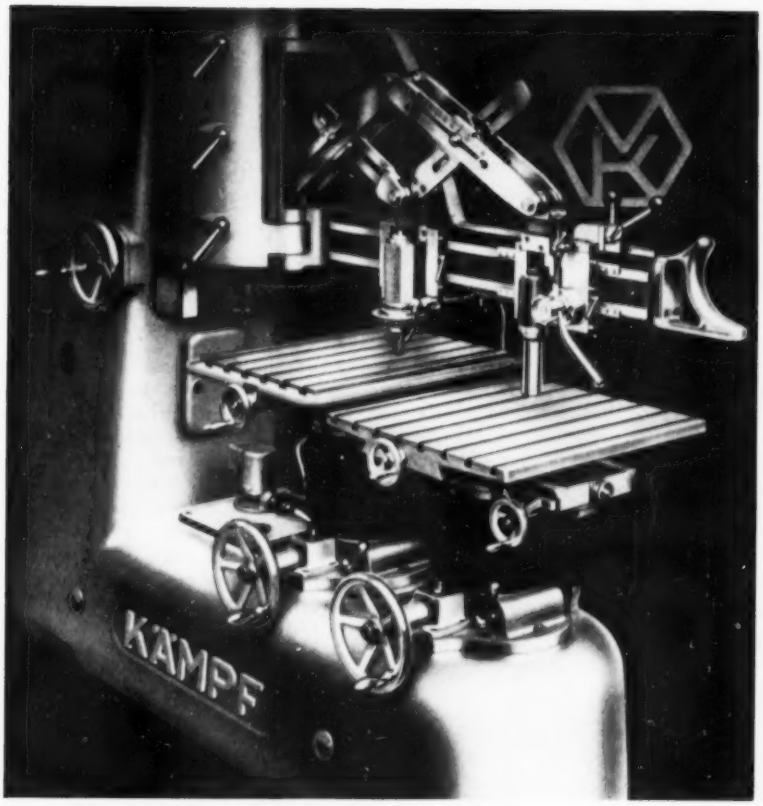
Class H silicone insulated motors provide maximum overheat-protection. All models are available with either duolift rams, providing full free lift, or monolift, permitting 19¼-in. lift before overall height begins to increase; full telescopic lift height of 132 in.

Series has four speeds in both forward and reverse, hydraulic safety fuzes, and maximum accessibility for maintenance.

Automatic Transportation Co, 149 W 87th St, Chicago, Ill

Photoswitch electronic timer Type 30HL1 is an automatic unit for intervals from 1/20 second to four minutes. Provides four basic types of timing: interval, delayed action, automatic repeat, and programming, as well as many variations. Shifts may be accomplished by changing external connections to the terminal board.

Photoswitch Inc, 77 Brodway, Cambridge, Mass



Kampf Diesinking Machine Employs Vertical Pantograph

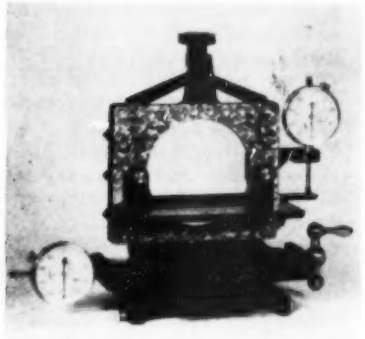
Type FK/2a milling machine for reproducing from templet dies and molds obtains the desired reduction from a master by a vertical pantograph. The pantograph is mounted on a rigid and horizontally oscillating arm.

Reduction can range from 1:1.5, to 1:4, and with a special attachment can be 1:1. Stepped pulleys permit spindle speeds from 270 to 6400 rpm.

Vertical suspension of the pantograph is claimed to permit heavy stock removal by eliminating vibration of the spindle. The swivel arm carries the pantograph with milling spindle and tracer pin each held vertical in cross slides said to prevent vibration when making heavy cuts.

The machine is manually operated. The operator has sensitive control of pressures, said to result in good surface finish and dimensional accuracy.

Imported by Rene Boas and Associates, 92 Liberty St, New York 6, NY



Universal Coordinate Stage For Optical Comparators

Coordinate measuring stage for use on Bench optical projectors, or any optical comparator provides 1-in. longitudinal, vertical, and focusing travel. With addition of two 1-in. travel dial indicators, measurements in coordinates can be made.

Stage is equipped with adjustable right-angle platform which can be positioned in three planes.

Portman Instrument Co, Inc, 6 Manhasset Ave, Port Washington, NY

Micro-Finish Assortment of Diamond-Lapping Supplies

A complete assortment of diamond lapping compounds and equipment is now available in one package. Nine Spectrum grits, sizes 120, 170, 325, 600, 1200, 200, 3000, 8000, and 14,500, and three other grit sizes are available.

The Master Kit includes a 4-oz bottle of diamond lapping oil, an atomizer oil applicator, assortment of Spectrum micro laps, orangewood sticks, and felt mounted points. Supplied in a walnut case.

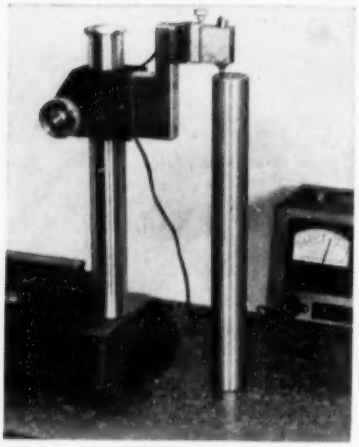
Penn Scientific Products Co, 5941 Alma St, Philadelphia, Pa

Universal Cleaning Spray

Kelite Spray White is a new industrial cleaner applied by a hand-sized pressure spray gun. Removes grease, oil, wax, dirt, dye, cutting soap, and light carbon from metals, plastics, rubber, porcelain, composition, concrete or wood. Cleans without heat, odor, fumes, solvents, fire-hazard, or danger to the skin.

The product is sprayed on and wiped off without hard rubbing or scouring. Gun is charged with air pressure from any source, can be refilled in a few seconds, and holds enough material for several hours of average cleaning.

Kelite Products, Inc, 1250 N Main St, Los Angeles, Calif



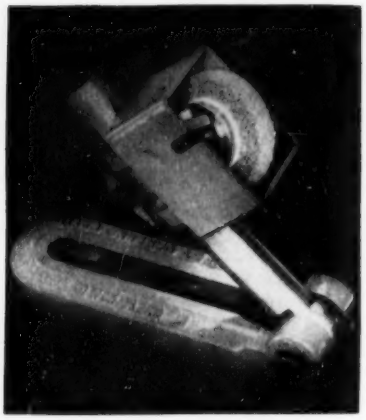
Attachment Adapts Production Gage for Surface-Plate Work

Par-Ac adapter bracket has been developed by Cleveland Instrument for adapting its stand-and-anvil-type electronic production gage to a wide range of surface-plate work.

Bracket is attached to the back of the saddle on the stand, and carries either the gage head or an Indi-Ac electronic indicator head. Heavy base and column provide more rigid support than any indicator stand, yet is readily positioned on the surface plate.

Unit can be attached for holding gage head to reach extra-high or extra-low surfaces. Head can be mounted upside down for checking bottom surfaces.

Cleveland Instrument Co, 735 Carnegie Ave, Cleveland, Ohio



Universal Grinding Wheel Dresser

Newman Model No. 6 grinding wheel dresser can be bolted down for cutter for cylindrical grinders, or can be used on a magnetic chuck for surface grinding. Shaft can be tipped completely forward or backward; dresser wheel unit can be adjusted up or down, or swiveled on shaft, depending upon angle desired for dressing or trueing the wheel.

This latest model in the line, with N-D1-46, or N-D2-46 wheels, is particularly adaptable as a diamond wheel dresser. Replacement wheels are interchangeable on all models.

L Newman Tool Die & Machine Work, 1001 Twenty-Fourth St, Oakland, Calif

Needle Bearing Bushing Has Absolute Seal

Needle bearing pilot bushing is available which provides an absolute seal against dirt, coolants, and grit entering the cavity. Effectiveness of the seal is said to be increased as foreign material enters outer seal. Line of needle bearing bushings also permits closer center distances than roller bearing units.

Bushings can be disassembled without removing housing, and are designed to protect against thrust loads, as well as radial.

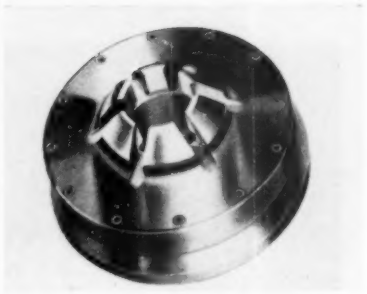
J G Jergens Co, 11106 Avon Ave, Cleveland, Ohio

Side-Exhaust Dust Collector For Use Under Worktable

Torit Dust Collector No. 66 is equipped with a left-panel exhaust outlet to provide recirculation of cleaned air when unit is in use beneath a bench or worktable.

The 33-in.-high model, powered with a ½-hp motor, moves 370 cu ft of air per minute at an air speed of 7500 ft per minute with a static pressure of 4½ in.

Torit Manufacturing Co, 280 Walnut St, St Paul, Minn



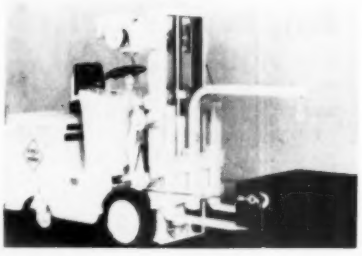
Diaphragm Chuck Has Stronger Grip for Heavy Machining

Sheffer air-operated diaphragm chuck employs a simple, compact booster mechanism within the self-contained air cylinder, said to develop a thrust many times greater than a conventional cylinder of equal size.

Stepped-up power permits use of a stiffer, heavier diaphragm for higher torque factor and extremely accurate repeating under production conditions.

With multiplied power, full jaw opening is assured on each cycle, regardless of fluctuating line pressure; overdistortion of the diaphragm is prevented by positive stops built into the mechanism.

Sheffer Collet Co, Traverse City, Mich



Fork Truck Is Specially Equipped for Die-Handling

Multi-purpose fork truck designed for placing and removing dies from presses, and equipped with forks, a boom, and die-pulling mechanism, has been added to the Elwell-Parker line.

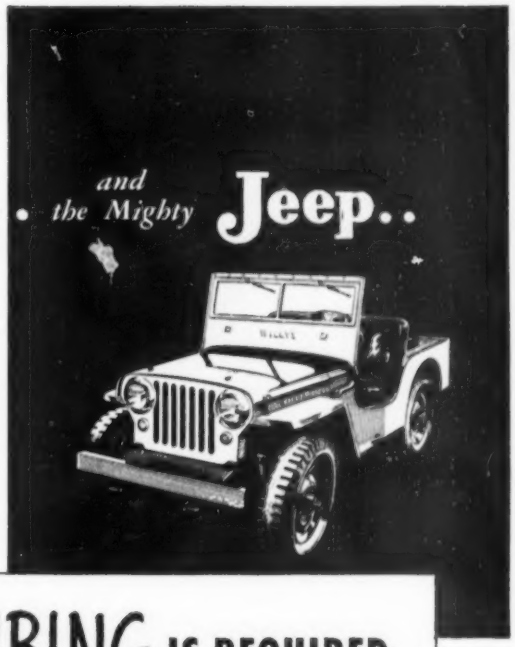
Truck handles dies weighing 1500 lb, adapters of 650 tons, trimmer dies weighing 400 lb, and inserts of 50 lb. The 4000-lb-capacity truck has 42-in.-long forks and boom, the latter for use when dies cannot be easily handled with the die-pulling device.

Unit is 83 in. high, with a 66-in. lift; it can be used as a standard fork truck when not handling dies.

Elwell-Parker Electric Co, 4205 St Clair Ave, Cleveland, Ohio

IN THE MANUFACTURE OF

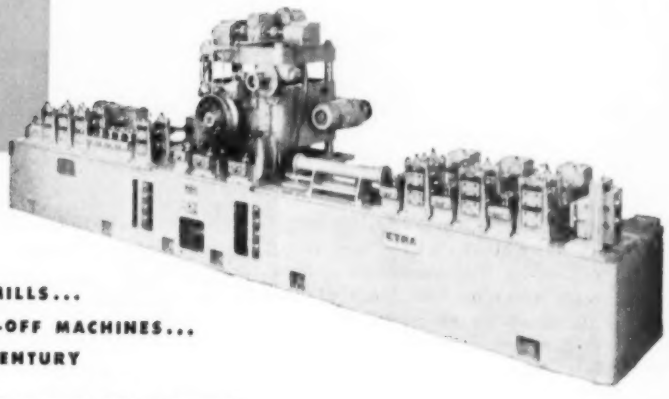
The New Aero Willys.... *and the Mighty* **Jeep..**



MILE AFTER MILE OF STEEL TUBING IS REQUIRED

ETNA TUBE MILLS HELP DO THE JOB

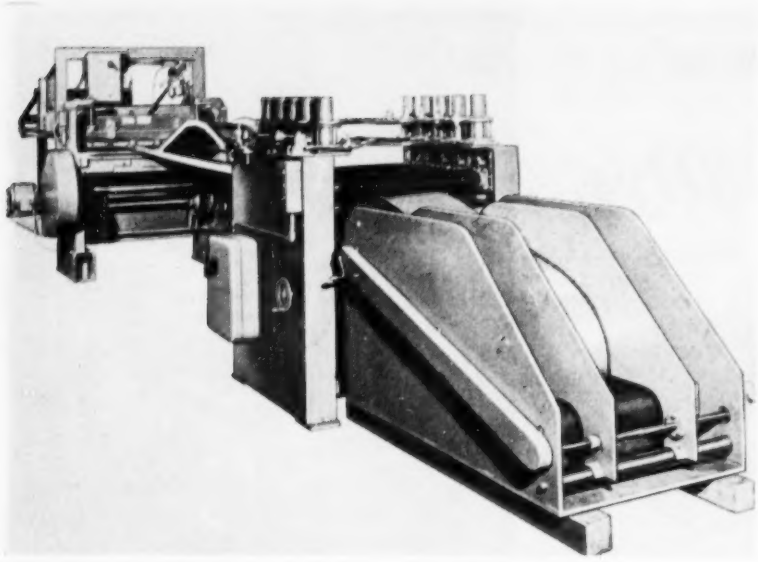
Regardless of the type of tubing you require, there is an Etna Resistance-Weld Tube Mill suited to your requirements. Etna invites comparison of their mills with any other on the market. For faster, more uniform production of steel tubing, regardless of finish or end use, consult Etna engineers. Etna mills are designed to meet your individual requirements.



MANUFACTURERS OF HEAVY DUTY TUBE MILLS...
SWAGING MACHINES...TUBE CUT-OFF MACHINES...
FOR MORE THAN HALF A CENTURY

THE ETNA MACHINE CO.

3400 MAPLEWOOD AVE. TOLEDO 10, OHIO



Union Automatic De-Coiler-Shearer Requires One Attendant for Operation

Union Tool machine de-coils, levels, shears, and stacks any flat material automatically, with one attendant.

Unit handles steel coils up to 13-gage, widths from 6 to 60 in. It can be set to shear lengths from 6 to 60 in. with a plus or minus variation of only 1/64 in; lengths can be changed with a single adjustment.

Sheared pieces are automatically stacked ready for removal. Operating speeds are up to 150 sfpm, depending upon length to be cut.

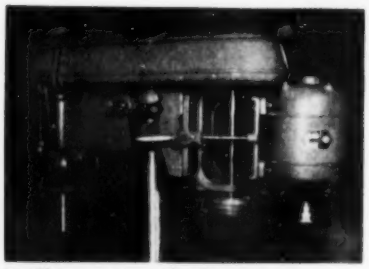
Union Tool Corp, Warsaw, Ind

Attachment Speeds Name Plate, Dial, and Panel Engraving

New Hermes Serial Numbering Dial, Part No. 411-BM151, is an attachment for use on the company's Engravograph. The device has been designed to speed up engraving consecutive numbers on metal and plastic name plates, dials, and panels, by eliminating necessity of sliding new numeral templets into the machine after each number has been engraved.

Dial is mounted on the machine and may be operated by unskilled labor. It consists of a double range of numerals which permits automatic consecutive changes of either the last one or two digits.

New Hermes Engraving Machine Corp, 13-19 University Place, New York, NY



Drillpress Speed Changer

Drillpress speed change mechanism, called the Vari-Speed Changer, is designed to fit any 17- to 20-in. drillpress.

Speeds can be altered by releasing a toggle-action lever and slipping the belt to proper pulley step. Unit permits changes from 125 to 4000 rpm with a 1725-rpm motor.

The accessory uses the belt supplied with the drillpress.

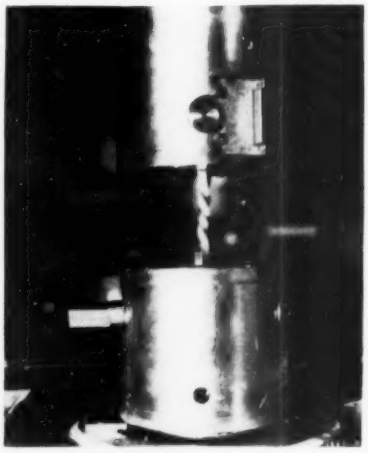
Boyd Machine, Inc, 711 E Fourth St, Royal Oak, Mich

Free-Machining Screw Steel Made By Open Hearth Process

Free-machining steel for making of screws, nuts, studs, bolts, and other small machined products is being produced by open hearth process at Jones & Laughlin; steel is furnished in the form of cold-finished bars.

J&L 1200 series is said to give greater uniformity, superior machinability, and a higher quality finish than conventional screw stock. First heats made in a pilot furnace showed good rolling characteristics, high quality surface, satisfactory response to cold drawing, and excellent machinability. Large mill size heats were then made and distributed to automatic screw machine shops for production tests; 1200 steels are reported to give better results in production speed, finish, and tool life.

Jones & Laughlin Steel Corp, Gateway Center, Pittsburgh, Pa



Iron Powder Metal Bends, Twists, Without Breaking

Iron powder metal, called Steel Oilite, has been developed with high ductility properties; physical properties are comparable to mild carbon steel.

The product withstands 70,000 psi pressure, approximately twice that of iron powder parts for regular usage. In addition, it is not brittle, and may be bent or twisted without breaking.

The product can be used for finished machine parts, such as gears, cams, brackets, and lever arms. Although retaining some porosity, it is not intended for self-lubricating applications. It can be plated by any of the normal processes; may be hardened by direct quenching, or carburized and hardened.

Chrysler Corp, Amplex Div, Detroit, Mich

Special

REVERE MILL TECHNIQUES

serve American Sanitary

Shown here are a few of the more than a thousand of American Sanitary plumbing goods made largely of Revere brass plumbers' tube. This tube is made by special techniques developed by the Revere Mills to assure easy fabrication into plumbers' items.

Almost every home in this great country of ours has plumbing. Most people never give a second thought to traps and bends and elbows, sink strainers, flanges and so on. But both Revere and American Sanitary Manufacturing Co., Abingdon, Illinois, think a lot about them. American Sanitary makes over a thousand such items for plumbing, and buys a great deal of Revere brass plumbers' tube, also hexagonal O.D., round I.D. heavy wall leaded brass tube for easy machining into fittings. The point about this long association between Revere and American Sanitary is that Revere uses special mill techniques to produce brass plumbers' tube. These techniques make it possible for American Sanitary to produce the bends, often at 180°, without cracking, without marring the finish. Thus nickel or chromium plating can be carried out successfully, and beautiful parts produced, the parts that householders admire, and which add to the value of both new and older houses. Thus, behind even the most taken-for-granted articles there is usually a lot of special skill and know-how.... If you would like to benefit from the capabilities of the Revere Mills, and of the Revere Technical Advisory Service, get in touch with the nearest Revere Sales Office. See your telephone directory, or write direct.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

• •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

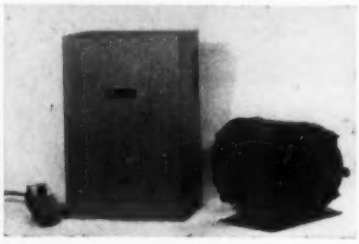
Nylon Inserting Tool

Prewinder inserting tool molded of duPont nylon, with a lifetime guarantee, has been developed for installation of Heli-Coil stainless steel wire thread inserts.

Prewinder thread in tip of tool compresses diameter of the wire thread insert and aligns its helix to match helix of the tapped threads to be protected. Slotted mandrel with a crank handle engages the tang on the insert; turning the handle screws the insert into the nylon prewinder thread. Tapered nose of the prewinder is then placed against the tapped hole. Further turning of the handle winds the insert into the tapped hole, the tool acting as thread guide. Large nylon sleeve permits a firm grasp.

Inserts are available in the following thread series: Coarse and Fine; Unified Coarse and Fine; Automotive Spark Plug; Aviation Spark Plug; and Pipe Thread. Applied in aluminum, magnesium, copper alloys, plastics, and fiber.

Heli-Coil Corp, 1285 Shelter Rock Lane, Danbury, Conn

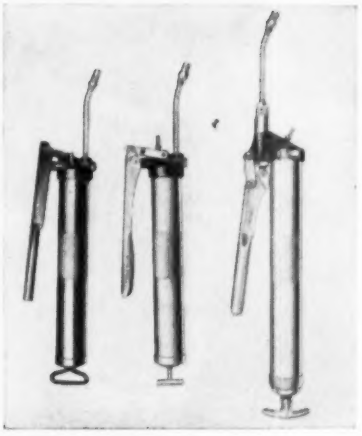


Servospeed Redesigns Electronic Variable Speed Motor Controls

Redesigned line of Servospeed electronic variable speed motor control systems is now available up to and including 3-hp models. New line makes use of special terminal block transformer construction, cabinet design for wall or bench mounting, and critical component plug-in assemblies.

Electrical design utilizes the motor series field as a torque signal source in a feedback circuit to provide constant system torque capability. Controlled acceleration on many models allows use in applications of high inertia loads without placing excessive torque load on materials in critical processes.

Electro-Devices, Inc, 4-6 Godwin Ave, Paterson, NJ

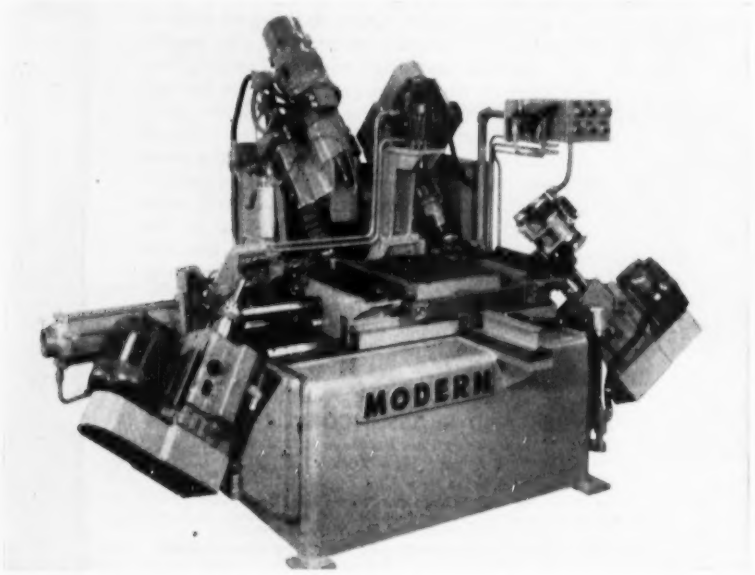


Lever-Type Grease Guns Made in Extra-Large Sizes

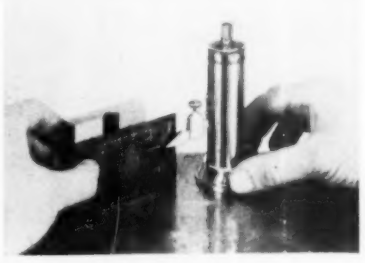
Four large-size models of Lincoln lever-type grease guns are available, said to hold 40 to 100% more lubricant than ordinary guns. Units can be refilled in seconds from a filler pump or by suction.

Models available include two 21-oz capacity guns developing 10,000-lb pressure; a 32-oz capacity unit with 10,000-lb pressure; and a 32-oz capacity volume-type gun, developing 4300-lb pressure. All are equipped with long hydraulic coupler extension for contacting hard-to-reach fittings.

Lincoln Engineering Co, Natural Bridge Ave, St Louis, Mo



ENGINE CYLINDER BLOCKS are drilled and tapped with oil holes at compound angles in transfer machine handling 55 blocks per hour at 80% efficiency. Blocks are loaded endways on the fixture. As the table shuttles into drilling position an air cylinder clamps the block and locating pins move into holes in the block. — *Modern Industrial Engineering Co, 14230 Birwood Ave, Detroit 4, Mich*



Micro-Height Gage

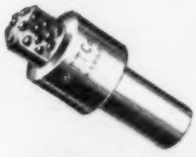
Micro-height gage is equipped with a high-speed steel scriber giving a 2-in. direct capacity with scriber inserted in the support, straight edge down. By reversing the scriber, 1 in. is gained, increasing direct gage capacity to 3 in. Used on a 1-2-3 block, measurements can be made up to 6 in.

Scriber can be replaced with a dial indicator to determine quickly and accurately the amount of error on center distances or surfaces for corrections.

Fairfield Gage Co, Inc, 182 Herbert St, Bridgeport, Conn

RADIUS FORMING TOOLS

"TRU-LINE" PROFILE DRESSING TOOLS

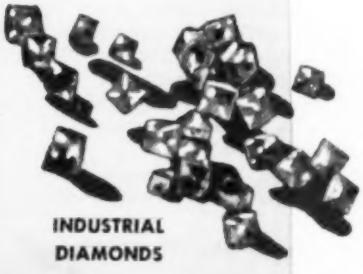


IMPREGNATED DRESSING TOOLS

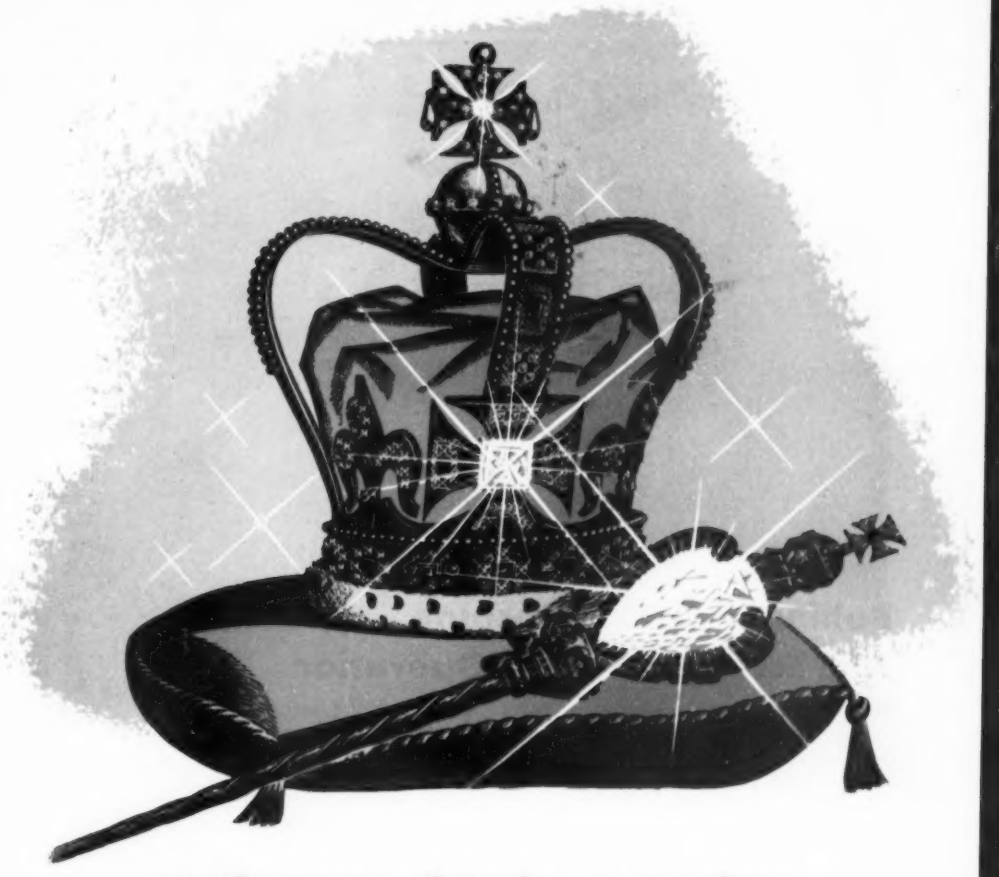
STANDARD DRESSING TOOLS

"TRU-THREAD" THREAD DRESSING TOOLS

DIAMOND GRIT TOOLS FOR THREAD DRESSING



INDUSTRIAL DIAMONDS



A Mountain of Light, and a Star

When the royal crown is placed upon a British monarch's head, the soft lights of Westminster Abbey dance upon some of the most beautiful jewels in existence, including two of the world's greatest diamonds—the Koh-i-noor and the Great Star of Africa.

The Koh-i-noor, or "Mountain of Light," was found four thousand years ago in the legendary diamond fields of the King of Golconda. War, conquest, torture, theft, assassination and barter brought it to princes, moguls, shahs and rajahs, and brought tragedy, too, so the legend says, except when it was worn by a woman. Originally it weighed 800 carats, but cutting has reduced it to 106¼ and greatly increased its beauty. It adorns the front of the Queen's crown.

The Great Star of Africa, set into the top of the royal scepter, weighs 516½ carats and is the largest cut diamond in the world. The original stone weighed 3,025 carats (about a pound and a half) and although it was the largest diamond ever found, was, obviously, but part of a much larger stone, still undiscovered.

The Great Star was found in 1905, just five years before this company was founded, and came from Premier Mine No. 2 in South Africa, which produces many of the fine industrial diamonds which we have imported for our customers during our 43 years. Our field engineers are at your service.

WHEEL TRUEING TOOL COMPANY

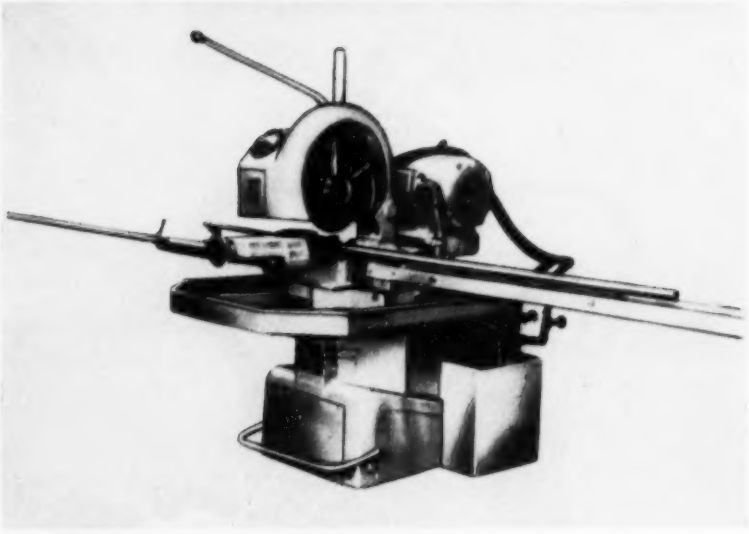
12-3200 West Davison Avenue • Detroit 6, Michigan

ESTABLISHED 1910

Offices in Principal U. S. Cities—Agents Throughout the World

WHEEL TRUEING TOOL COMPANY OF NEW JERSEY
33 West Street, Bloomfield, N. J.

WHEEL TRUEING TOOL COMPANY OF CANADA, LTD.
575 Langlois Ave., Windsor, Ont.



Ballinger Cutoff Machine Has Eccentric Wheel Operation

High-speed abrasive cutoff is made possible on the Ballinger machine by the eccentric head, Hydrosurge, and load indicator.

The abrasive wheel is supported and driven by a hollow main shaft. Within this shaft is an eccentric fitting and a smaller internal shaft. This causes the abrasive wheel to be eccentric to the main shaft. Thus the path cut is at a greater radius than the radius of the abrasive wheel. Contact between work and wheel is said to be greater and pressure less. The wheel is lifted from the work during each revolution, allowing coolant to flow between work and wheel. The eccentric is driven at a slower speed than the wheel is rotated.

A segment of the cutting wheel is encased in a removable housing which contains integrally cast radial vanes. The coolant is supplied by a normal coolant pump to each half of the housing guard. The rotation of the abrasive wheel builds up water pressure on the wheel faces. This is said to increase the cooling effect and to reduce blade oscillation.

A load indicator tells the operator the pressure of the feed applied. The machine is claimed to make cuts parallel within ± 0.005 in. in the hardest materials without producing a burr or fraze.

Imported by Ballinger Div, Douglas Export-Import Corp, 17 Battery Place, New York 4, NY

Heavy-Duty Ventilated Clutch

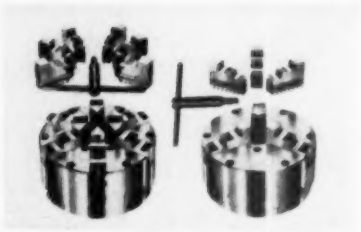
Fawick VC air-ring clutch, a completely ventilated clutch of the rigid type, provides for power transmission from the friction shoes through torque bars to the metal sideplates of the assembly.

It has been especially designed for heavy-duty service with high-starting loads and sustained slippage where generated operating heat lowers clutch efficiency and shortens operating life.

Design features include: cooler operation inherent in drum clutch, plus isolation of operating tube from the heat-generating friction surface; riveted, replaceable friction lining; loose, expanding operating tube which can be replaced without removing clutch from shaft on which it is mounted.

Unit is available in sizes ranging from 12-in. through 42-in. drum diameters, with torque capacities from 27,000 to 380,000 in.-lb.

Federal Fawick Corp, Airflex Div, 9919 Clinton Rd, Cleveland, Ohio



Large Size Ajust-Tru Chuck

New 9-in. Ajust-Tru chuck is designed for 0.0005-in. precision within one minute on original chucking, and universal scroll chuck rechucking speed on duplicate work. Pinion and bevel gear portion of the scroll have generated teeth for smoother operation.

Unit holds work up to 8 in. in diameter. Available with three or six internal and external jaws.

Buck Tool Co, 2015 Schippers Lane, Kalamazoo, Mich

Magnetic Brakes Available In Fractional Horsepower

Fractional horsepower Dings magnetic brakes for all standard ac or dc electric motors are now available with torque ratings of 1½, 3, and 5 lb ft.

Units have thermal ratings of 6-, 7-, and 8-hp seconds per minute, respectively. Brakes self-adjust for wear, but critical adjustment of torque can be made for precisely timed stops. Design eliminates solenoids and mechanical linkages.

Motor and brakes are connected in parallel; when motor starts, energized magnet operates to release pressure on rotating friction disks; stopping motor de-energizes magnet, freeing pressure plate; firm pressure is applied to disks, instantly stopping motor, and holding load.

Dings Brakes, Inc, 4740 W Electric Ave, Milwaukee, Wis

OSBORN

BEFORE: Closeup of helical gear before deburring.

Gone . . . costly thorns in their side

Burr removal by muscle methods is aggravating because it is costly, inefficient and non-uniform in quality. Here's how a truck manufacturer has banished these "thorns in the side" with push-button brushing.

The operation: to deburr, break and blend the flank edges of gear teeth prior to shaving and heat treating. Formerly done with a hand tool, in several operations, the work was tedious and required close inspection and reworking to meet rigid specifications.

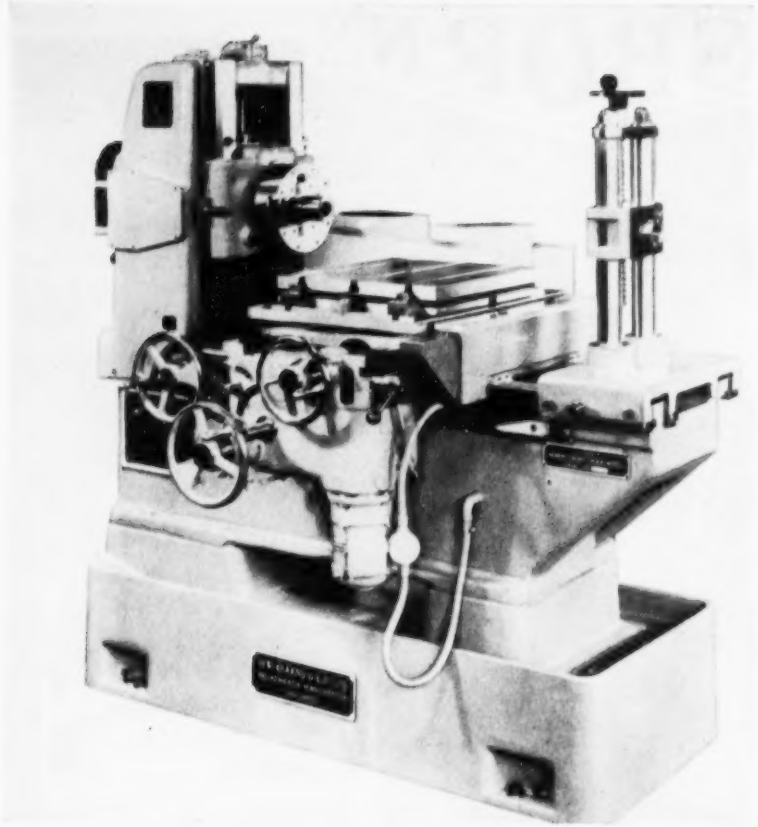
Now, an Osborn Brushing Machine in one speedy operation smooths the entire tooth edge . . . produces *uniform blending* of surface junctures of *every tooth*. Result: lower costs and greater precision for *better performance* of the product in service.

Find out how *you* can cut your costs and improve *your* products with power brushing. Call the nearby **O**sborn **B**rushing **A**nalyst or write *The Osborn Manufacturing Company, Dept. C-5, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

AFTER deburring with Osborn Brushing Machine.

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES



Kearns Optimetric Jig Mill Offered by British Industries Corp

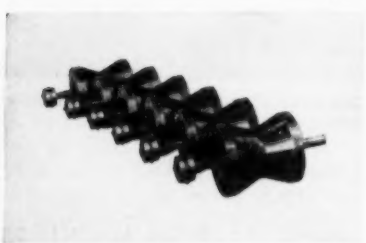
Machine tools, accessories, and parts built by H W Kearns Co, Manchester, England, are now being imported by British Industries Corp. Standard boring mills can be ordered under the "unit" system with wider beds, longer beds, larger spindles, or increased spindle height when required.

The Optimetric jig mill has an optical system for vertical and transverse motions with a glass scale whose engraved increments are projected on large ground-glass screens.

Settings are said to be accurate to 0.00025 in. The 4x1½-in. screen is said to avoid eye strain. Because measurements are made from the scales, error or wear in the leadscrew is said to cause no difficulty.

A compound table supporting a detachable revolving table slides on the main bed and is provided with a separate feed motor. At the left end of the main bed is a central thrust type of upright with the spindle slide. The spindle is driven by a 1½-hp ac motor. The table has three reversible power feeds to transverse and longitudinal motions from a constant-speed, ¼-hp motor.

Imported by International Machinery Div, British Industries Corp, 16½ Duane St, New York 13, NY

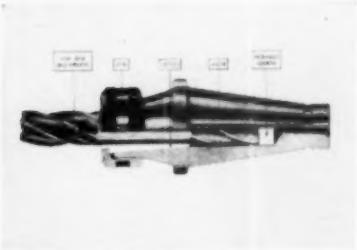


Permanent Magnetic Rolls

Non-electric concave and straight magnetic rolls with high surface strength have been designed to cut time and labor cost in handling pipe, rods, angles, flat sheets, plates, and bars. Rolls use no current, require no wiring, and minimum maintenance.

Rolls for rods and angles are concave to keep pipe material centrally located; those for handling flat materials are straight-faced.

Dings Magnetic Separator Co, 4740 W Electric Ave, Milwaukee, Wis

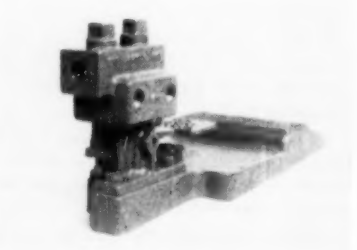


B & V Collet Chuck for Use On Wide Range of Machines

B & V collet chuck, made in Sweden, is now available in this country. Furnished with Morse, Brown & Sharpe milling machine taper, or with straight shank, B & V may be used in milling machines, boring mills, drilling, centering, or grinding machines, lathes, and automatic screw units.

Chuck is available in a range of 48 models, capacities from ⅛ to 2 in. Uses a single taper collet with a flat contact surface against the nut, thus holding along the entire length. Overhang is small; maximum runout is 0.0004 in. Design reduces friction resistance between nut and collet for better nut tightening, and more powerful grip on the tool.

Imported by Victor Machinery Exchange, Inc, 251 Centre St, New York, NY



Foot Valve Cuts Operator Fatigue

Cast aluminum base has been designed to enable operator to use valve with foot in a comfortable position. It need not be fastened to the floor, and can be moved to suit convenience.

Ports are ¼ in. Valve operates on airlines up to 100 psi and has adjustable speed control in either direction to give fast or slow operation of cylinder ram. Price, $14.75.

Air Fixtures, Inc, Dept 87, North Manchester, Ind

Here's what the **SUNNEN** folks wrote us recently about their Sidney Lathes:

TELEPHONE: STERLING 2100

SUNNEN PRODUCTS COMPANY

Automotive Service Equipment · Precision Honing Machines

7910 MANCHESTER AVENUE, ST. LOUIS 17, MISSOURI

Our 16" Sidney has proved to be everything Sidney said it would be.

We have made many odd shaped dies and it will duplicate as accurately as a master part or template.

The Sidney is also easy to operate, the height is just right and all levers are conveniently located.

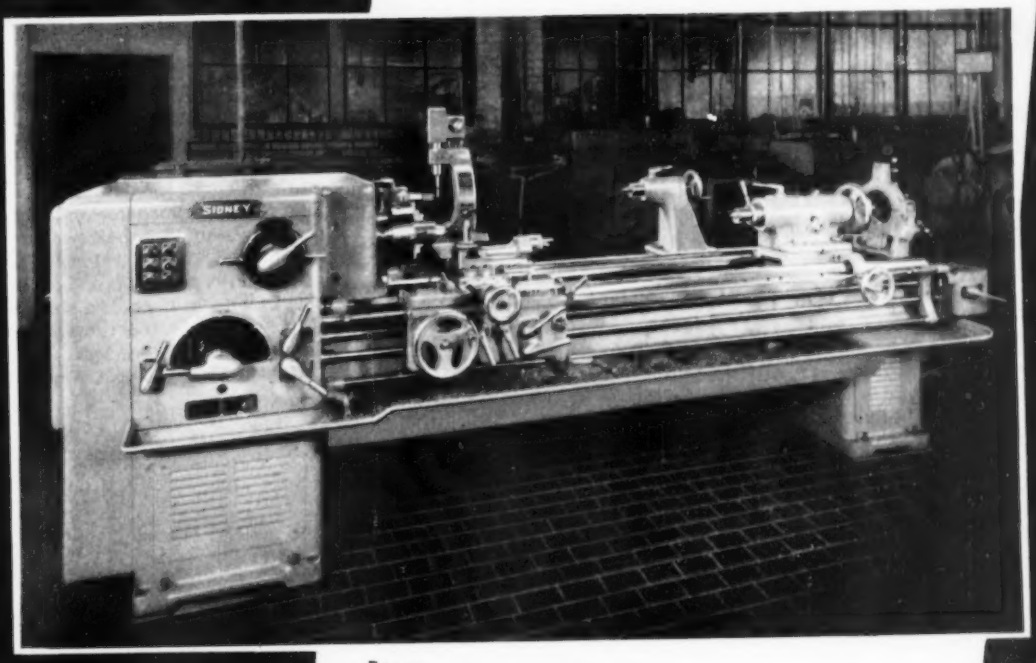
It is a real pleasure to operate a Sidney.

Cordially,

SUNNEN PRODUCTS COMPANY

George Maechling

George Maechling
Tool Room Foreman



SIDNEY FLUID TRACER LATHES

For you . . . as well as for Sunnen Products Company of St. Louis and scores of other leading makers of precision equipment . . . Sidney Lathes can do a terrific job . . . ECONOMICALLY!

The sensitive tracer head transfers every change in contour from any master piece or template to the cutting tool. A separate control switch turns off the tracer motor while the machine is performing standard lathe work.

WRITE FOR BULLETINS

THE SIDNEY MACHINE TOOL CO. • SIDNEY, OHIO

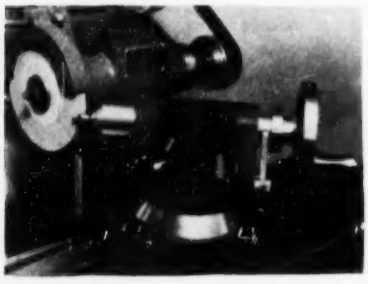
Builders of Precision Machinery since 1904

New Model Equalizing Sling Available in Nine Sizes

Model 52 has been added to Caldwell's line of Adjust-A-Leg equalizing slings for use on crane hooks. New model is available in nine sizes, from ¾- to 28-ton capacities; capacities may be doubled by using two units of the same size. Safety factor of 5 to 1 at a 45° angle has been maintained, and as much as two-thirds of the rated load may be carried on one leg without slippage.

Locking device enables wire rope legs to be frictionally locked in place, an advantage when repeated identical lifts are to be made. Slings are available with standard or special leg lengths.

The Caldwell Co, Rockford, Ill



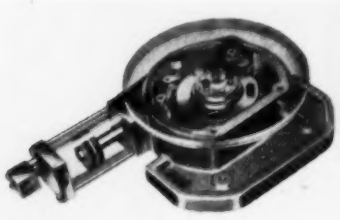
Studler Relief Grinding Fixture

Improved model of the Studler grinding fixture is available for relief grinding of end mills, spiral and straight flutes, countersinks, spot facers, center drills, and reamers.

Rocking head permits drawing cutter or reamer away from the wheel for indexing and retracting the spindle. Tools are held in the spindle by collet bushings ranging in sizes from 18 to ¾ in., and ¾ to 1 in. Second spindle or special collet bushing can be furnished by order for holding any type of cutter or center up to 1¼-in dia.

Fixture can be furnished with two types of bases, one a hinged type for angular grinding; both bases swivel radially to any position.

S & D Engineering Co, 525 Commercial St, Glendale, Calif



Allen Dial Feed Tables Equipped With Positive Lock

Models 11FA and 11FB Allen dial feed tables are available with a positive lock. Units are designed so that the top plate cannot override and lose index under severe operating conditions. Air cylinder toggles mechanical members to lock-feed pawl to ratchet. In indexed position an anti-back-up pawl locks the table against rearward rotary motion.

Both models are available in the standard 4, 6, 8, 12 and 24 set of indexing positions; accuracy is guaranteed to 0.002 measured at periphery of the 11-in. top plate.

Model FA is priced at $325; model 11FB, with a two-way valve and pilot timer valve for automatic operation, is $365.

A K Allen Co, 57 Meserole Ave, Brooklyn 22, NY

Device Raises, Lowers Trucks To Dock Height for Handling

Adjust-A-Truck is a device designed to raise or lower carriers to dock height. The 40,000-lb-capacity unit is set into the pavement in front of the dock; heavy-duty electric hydraulic system adjusts each vehicle to desired height. Standard deck size is 10x12 ft long.

Raising and lowering operation is instantaneous, by means of a wall-mounted, momentary contact, double pushbutton station.

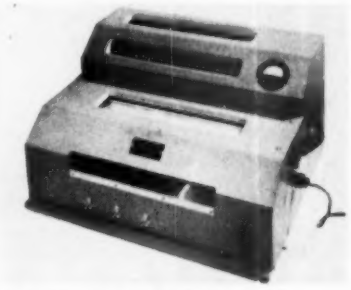
Rowe Methods, Inc, 2534 Detroit Ave, Cleveland, Ohio

Lightweight Drill Designed For Heavy Production Work

Mighty Midget is a ¼-in. drill available in six standard chuck speeds ranging from 5000 to 600 rpm.

Built for heavy-duty production work, the drill is light and powerful, and designed for easy handling in close quarters. The ball-bearing unit is equipped with helical gears, pistol-grip handle, and a three-jaw geared chuck with rubber-flex chuck key. Universal motor operates on either dc or ac, 60 cycles or less.

Stanley Electric Tools, New Britain, Conn



Automatic Photo Machine Turns Out Dry Copies

Exact-Phote-Copy dry processing unit turns out dry copies of anything typed, written, printed, or drawn. Exposure is completed in 8 seconds, processing in 15 seconds. Machine produces 60 to 90 copies per hr at a cost of 8¢ each for letter size copy.

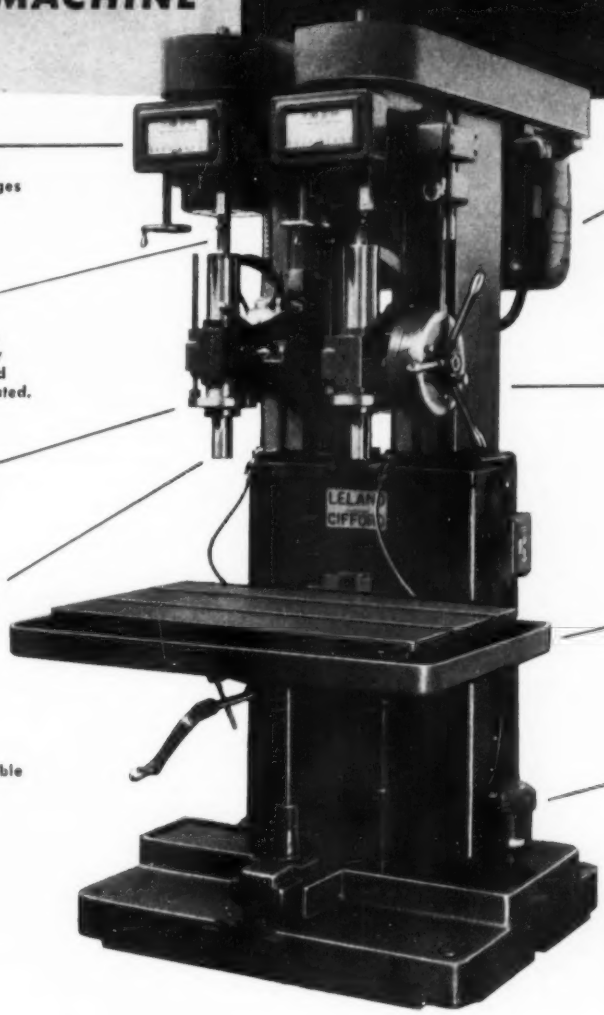
The 47-lb unit operates on 110 v ac; accommodates paper 12-in. wide, any length. Automatic unit is priced at $325; hand-operated models available from $105.

General Photo Products Co, Inc, General Photo Bldg, Chatham, NJ

ALL THE FEATURES YOU WANT IN A HEAVY DUTY DRILLING MACHINE

the new

LELAND-GIFFORD No. 3 MVB



Leland-Gifford indicating shift for instant speed changes without stopping machine.

20-tooth involute spline spindle for greater rigidity, less wear. Independently counterbalanced and continuously lubricated.

Flanged quill for mounting multiple (spindle) heads.

Capacity of No. 3 or No. 4 Morse Taper.

Base, column and table ruggedly built for maximum rigidity.

Totally enclosed, fan cooled, ball bearing NEMA motor mounted at rear and driving through V belts.

Semi-automatic power feed with 3 feed rates, automatic adjustable depth stop and safety slip clutch. Hand or hydraulic feed also available.

New design table with removable top for easy refinishing.

Coolant pump and tank readily accessible for cleaning.

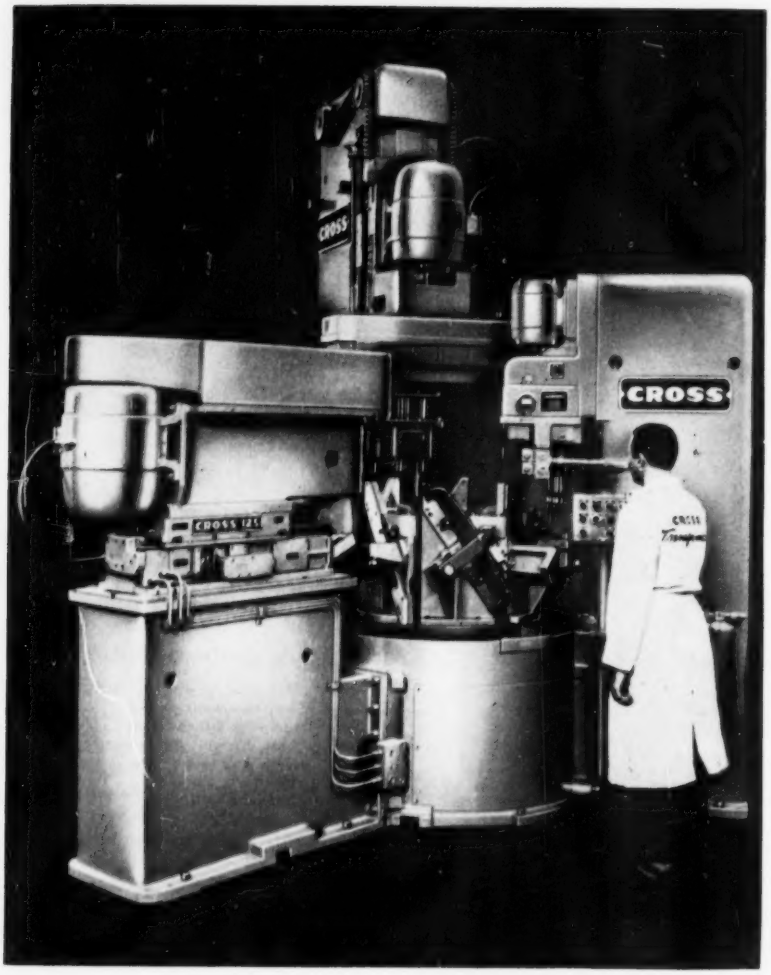
24" SWING
1 to 4 SPINDLES

Write For Complete Information

LELAND-GIFFORD

Drilling Machines

WORCESTER 1, MASSACHUSETTS, U.S.A.



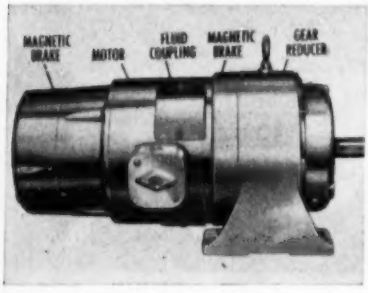
Special Machine Performs 5 Operations On Exhaust Manifold Tail Pipe Pads

New Cross machine is available for milling, boring, drilling, chamfering, and tapping the exhaust manifold tail pipe pad for 6-cylinder engines.

The five operations are performed at the rate of 120 pieces per hr. Parts are held on a fluid, motor-driven index table with six stations—one for loading and unloading, and one each for milling, boring, drilling, chamfering, and tapping.

Unit is equipped with hardened and ground ways, hydraulic feed and rapid traverse, individual leadscrew feed for tapping.

The Cross Co, Detroit, Mich



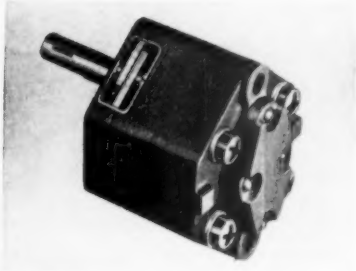
Reuland Fluid-Shaft Motoreducer Equipped With Holding Brakes

New Reuland Motoreducer has been designed to provide fluid-cushioned stops and starts, with the added advantage of a holding brake. Unit consists of a magnetic brake; motor with internal fluid coupling; second magnetic brake; and a gear reducer.

Typical of the uses for the new development are crane travel drives, in which it eliminates pendulum motion of the load through smooth acceleration and deceleration, yet permits a completely stationary holding action at any point.

Many combinations of fluid-shaft motors, brakes, and drives in a wide range of hp and rpm ratings are available to handle specific load requirements.

Reuland Electric Co, Alhambra, Calif



New Line of Hydraulic Pumps

LB series of hydraulic pumps has been added to Webster Electric's line. New models are designed for a variety of uses, including pressure lubricating, oil circulating, transfer and filtering systems, and lift and replenishing systems.

Pump is available with three capacities: 2.5, 3.5, and 4.5 gpm at 1800 rpm and 100 psi. Design permits use in pumping most liquids with a substantial oil base.

Model LBP has been developed for face mounting or wet sump application; model LBS includes a shaft seal, and is recommended for direct, gear, or belt drives; it is available also as a 115/230-v motor pump combination.

Oil Hydraulics Div, Webster Electric Co, 1900 Clark St, Racine, Wis

Saw Lubricators Increase Cutting Speeds 30%

ELF saw lubricators, developed in Consolidated Vultee's San Diego plants are said to have increased cutting speeds on an average of 30% and life of saw blades 300%.

Use of the lubricator eliminates saw chatter, and stops workhardening of the metal in the blade; consequently, number of welds in the blade is increased by three times where blade has to be welded on inside cuts.

Device enables operator to hold tolerances, producing more accurate cuts with less burring, and greatly improved finishes.

Aviation Lubricants Co, Inc, 1921 India St, San Diego, Calif

The fable of

The Three Brothers

HOLDS A LESSON FOR CUTTING FLUID USERS

The Fable

THREE brothers inherited equal shares of their father's farm. One brother feverishly worked his land, with seldom a rest, until prematurely worn out, he died at an early age. The second brother loafed and played until his land went to ruin and he died for want of food. The third brother, wiser than the other two, *balanced* his work and play, so that he prospered mightily and lived to a ripe old age.

The Lesson

BALANCING cutting fluids produces best results, too. The *proper balance of chemical activity* will provide the longest possible tool life consistent with surface finish desired.

Figure 1 shows abnormal front clearance wear of a single point tool due to *excessive* chemical activity of the cutting fluid used. The tool failed prematurely, just like the first brother in the fable.

Figure 2 shows abnormal cratering of a tool due to *insufficient* chemical activity of the cutting fluid used. Such cratering is usually associated with poor surface finish. This tool failed prematurely like the indolent brother in the fable.

Both of the above examples of tool failure were developed under identical conditions, except for the degree of chemical activity of the cutting fluids used.

The *proper balance of chemical activity* gives the most profitable results. For the right cutting fluids for your work, ask to have your Stuart Oil Representative call. Use the handy coupon below.

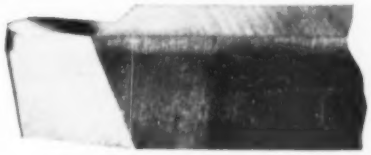


FIG. 1—Abnormal front clearance wear caused by excessive chemical activity of cutting fluid.

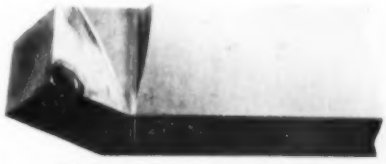


FIG. 2—Cratering of cutting tool, usually associated with poor finish, resulting from insufficient chemical activity of cutting fluid used.

More Than a "Coolant" is Needed

D. A. Stuart Oil Co.
EST 1865 LIMITED

TIME-TESTED CUTTING FLUIDS AND LUBRICANTS

2729 S. Troy St., Chicago 23, Ill.

In Canada: R. W. Horsey Canada, Ltd.
Subs. D. A. Stuart Oil Co., Ltd.
3575 Danforth Ave., Toronto

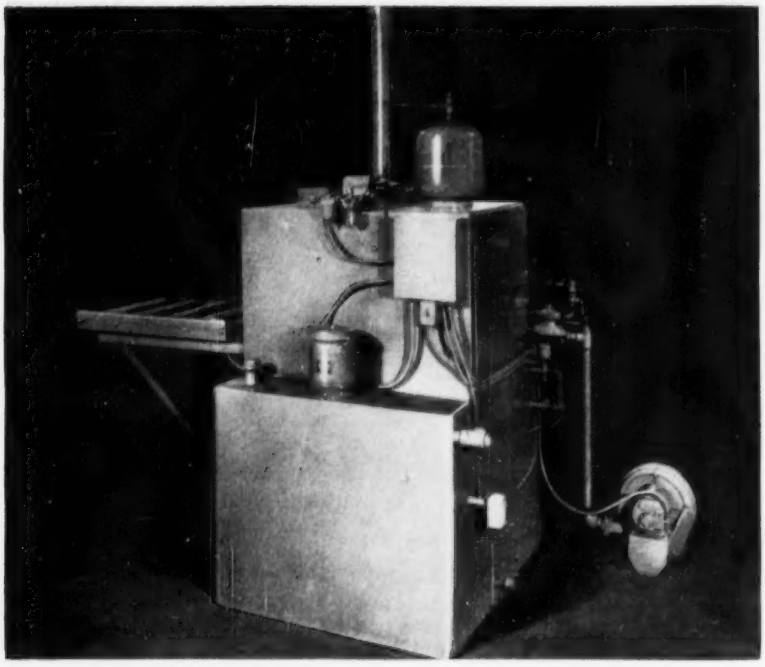
CLIP TO YOUR COMPANY LETTERHEAD AND MAIL

D. A. STUART OIL CO., LTD., 2729 S. TROY ST.
CHICAGO 23, ILL.

Check One ☐ Have Stuart Representative Call
☐ Send booklet "Cutting Fluid Facts"

Your name .....

Title .....



Ipsen Automatic Parts Washer Eliminates Rinsing Operation

An automatic surface spray skim-off that moves oil and other impurities into an overflow ledge eliminates secondary rinsing operations in this washer.

Solution temperatures, work handling, and cycles for solution circulation and skim-off are all controlled automatically by pre-settings on a panel located on the front of the washer. Washers are available in capacities of 300, 400, and 700 lb.

Load platforms can be attached to either end or to both ends. Immersion heating elements can be gas, electric, or steam operated. Cleaning solution is circulated downward through the work to prevent displacement of small parts.

During the drying cycle the load is sealed off from humidity and fumes of the solution. Excess solution is drained off the work and back into the tank.

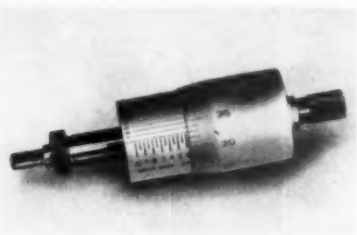
Ipsen Industries, Inc, 715 S Main St, Rockford, Ill

Degreasing Agent for Use in Tumbling Mills

Finely-ground cellulose fiber material with exceptionally high absorbency, called Cottentex, is now available for use in degreasing and drying operations employing tumbling mills.

Absorbing more than eight times its own weight, the material is said to do a fast, thorough job of taking up oils, grease, or any liquid from metals, plastics, or other compositions. Claimed to be particularly adapted for cleaning and degreasing ball, roller, and needle bearings, and other parts which can be processed in a tumbling mill.

Cottentex Manufacturing Co, 405B E Wells St, Milwaukee, Wis

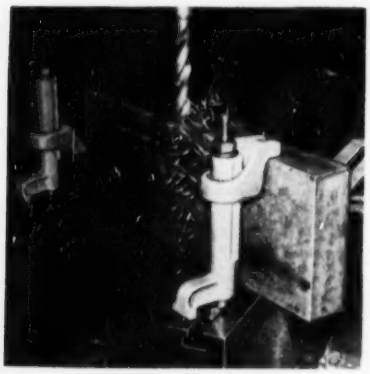


Spindle Micrometer Head

Non-rotating spindle micrometer head, manufactured by Tavannes Machines, Switzerland, has a 1-in. range, and reads by vernier to 0.0001 in.

The device, which is used as standard equipment on the Boeckeler Model No. 1 optical micrometer, is now available as a separate item for general mechanical and electronic applications.

Imported by Boeckeler Instrument Co, P O Box 6155, Tucson, Ariz



Clamp-All Eliminates Holding Devices on Radial Drillpresses

Clamp-All is a device for holding large or small work on radial drillpresses and other machine tools with T-slot beds; it can be used with any size or shape which has clamping surfaces within ¼ to 11 in. from machine bed.

Unit consists of a hardened T-slot bolt and flange nut, cast clamp post, and two interchangeable cast arms, one designed for high clamping, the other for low. Cast parts have tensile strength of 50,000 lb psi. Arm slides up and down post and locks to gage teeth on post at a point slightly higher than clamping surface on the work. A few turns of flange nut tightens grip.

Heavy-duty model has range from ½ to 11 in. from bed; standard model, ¼ to 9 in.

Clamp-All Co, 895 Montford Rd, Cleveland, Ohio

Portable Double Ram Table Feeds Large, Heavy Sheets

Double ram sheet feeding table is designed for feeding large, heavy sheets to presses, brakes, or shears.

Portable unit has a 3- to 10-ton capacity, and a 36x96-in. table top. It is hydraulically operated by multiple-speed foot pump, and is furnished with electric drives.

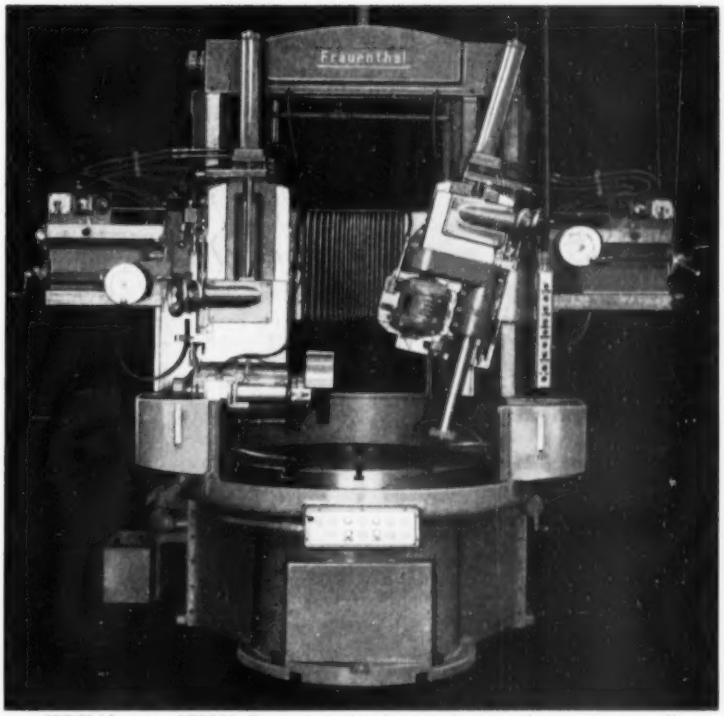
Rack Hydraulic Equipment Corp, Connellsville, Pa

GRIND TO MILLIONTHS OF AN INCH PRECISION on Frauenthal GRINDERS

PROBLEM: To assure *related* high-precision uniformity between tapered bores or diameters and flat surfaces.

SOLUTION: Special features were engineered into this Frauenthal Grinder, with one direct-connected spindle (at left) and one cartridge-type spindle (at right) for simultaneous grinding. Photo shows right-hand spindle compound swiveled about 10 degrees off vertical for grinding a tapered bore, while left-hand compound has its motor base swiveled 90 degrees, with axis of grinding spindle parallel to face of table for grinding surface with periphery of wheel.

ACHIEVEMENT: Vital precision parallelism and concentricity within 200 millionths of an inch (.000200"); perfect interchangeability of parts: less production and inspection time; lower costs, greater output!



SPECIAL 1800 SERIES Frauenthal Grinder grinds large diameters or small (1-inch diameter) holes simultaneously, to MILLIONTHS of an inch tolerance!

Great grinding range . . . special high-rail clearance for wide variety of precision work:

Astounding adaptability permits Frauenthal Grinders to do many heretofore "impossible" jobs. For miscellaneous work, unique features of this Special 1800 Series Grinder include: Cartridge spindle (right) with 16" extended quill, 30" overall clearance, speeds up to 10,000 RPM; Direct-connected spindle (left) with two-speed 1800/3600 RPM; pendant-type control for work table and grinding spindles; 180-degree pendant-swing; safety switch (cuts out all power at once) . . . and other features you'll find profitable.

Frauenthal

MULTIPLE-HEAD SUPER-PRECISION CYLINDRICAL **Grinders**

PRECISION-GRIND INSIDE, OUTSIDE AND FACES SIMULTANEOUSLY TO MILLIONTHS OF AN INCH!

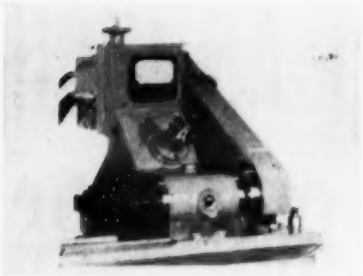
Similar special features can be engineered into standard Frauenthal Grinders for your specific needs.

write for bulletin

Frauenthal Division

THE KAYDON ENGINEERING CORP.

MUSKEGON, MICHIGAN



Hydraulic Head on Thread Miller Absorbs Vibration at High Speed

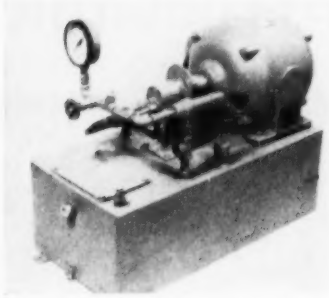
A new group of hydraulic thread milling machines has been added to the Hanson-Whitney line; four sizes are available: 4x9 in., 10x24, 15x30, and 20x48, with bed lengths to meet specifications.

New operating principles are said to reduce production costs by one-half, increase cutter life three times, and improve finishes on materials difficult to machine.

Speeds are infinitely variable up to 3000 rpm. Application of adjustable speed hydraulic motors to cutter spindle drive and work spindle drive permits balancing of cutter speed and workfeed, permitting use of carbide cutters where applicable. Adjustments are instantly possible during operating cycle to save time during setup.

Feeds are from 6 seconds to 1 minute per revolution; rapid traverse time is approximately 4 seconds. Operating cycles can be speeded to 10 times per minute. Hydraulic head absorbs and distributes vibration of heavy cuts at high speeds while generating smoothly finished threads within class-of-fit tolerances.

Hanson-Whitney Div, Whitney Chain Co, Hartford, Conn



Hydraulic Pumping Unit Has Low gpm Operation

Hackett hydraulic pumping unit, designed for low-cost operation, has capacities of 0.8 to 2.8 gpm.

Model has an all-steel welded reservoir; nitraloy gear pump is encased in high-strength aluminum alloy. Unit is completely piped with relief and check valves, reservoir and air breather filters. Pressures to 1200 psi.

Hackett Brothers, Inc, North Manchester, Ind

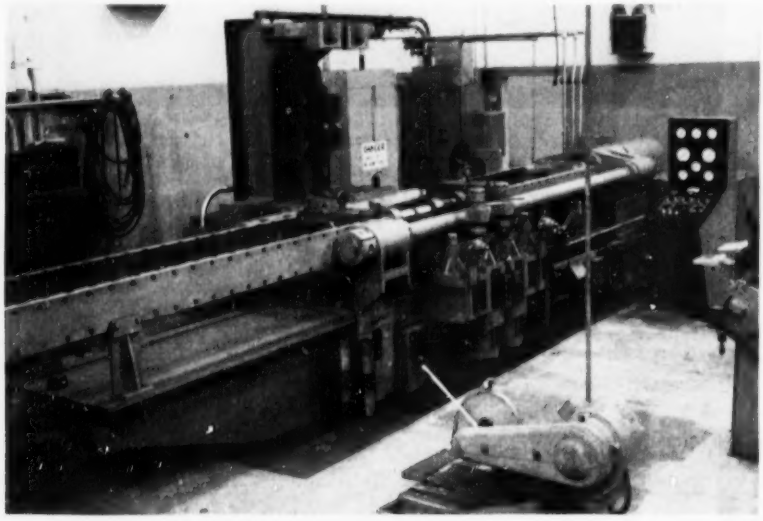
Precision Reciprocating Unit Performs Range of Operations

The Di-Profiler, a precision reciprocating hand machine driven by a flexible shaft with standard connections, has a controlled stroke, variable from 0 to 6mm; reciprocation speed can be varied from 0 to 100 strokes per second.

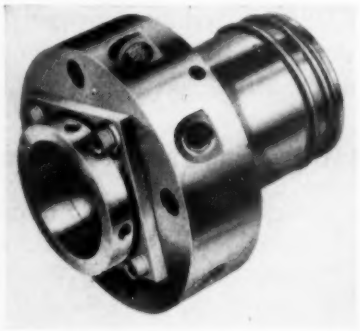
The lightweight machine is designed to provide greater speed and accuracy in filing, lapping, scraping, honing, and polishing on delicate, intricate pieces. It is said to be particularly adaptable for honing and lapping straight and curved surfaces; re-working hardened materials; finishing complicated dies and molds, and regular or irregular drawing dies; and precision lapping of small holes.

Range of diamond and tungsten-carbide files, points, blades, scrapers, cutters, and other tools are available for varied applications.

Engis Equipment Co, 431 South Dearborn St, Chicago, Ill



TAYLOR-WINFIELD 800 KVA FLASHWELDER is now being tested at Douglas Aircraft for electrical contact welding of Globemaster steel landing gear parts and struts, formerly welded by hand. 32-foot long machine accommodates work up to 12 ft in length; pieces are held in place with 40-ton clamping force. Steel, titanium or other metal bars with joining areas up to 12 sq in. can be welded almost instantaneously. Power is supplied by two 400-KVA transformers in parallel circuit, supplying current to top and bottom dies. Maximum welding current is 110,00 amp. — *Douglas Aircraft Co, Long Beach, Calif*



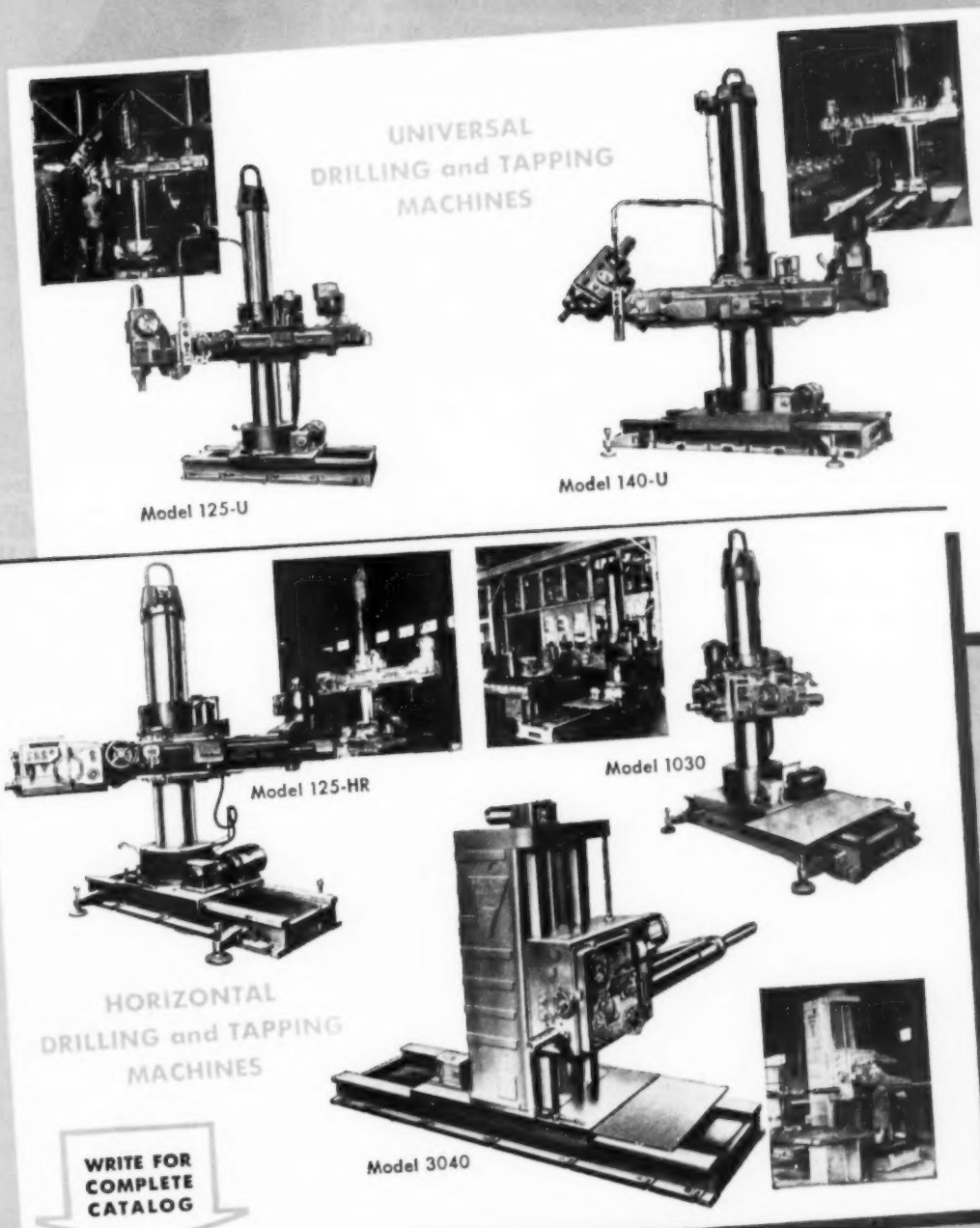
Packaged Stuffing Box Seals

Sealol Model SB stuffing box seals are completely pre-assembled for installation; no measurements are necessary to position the seal on the pump shaft.

Special hard facings are available for maximum wear resistance at point of sealing; control of hydraulic balance maintains minimum face loads to insure long life.

Sealol Corp, 45 Willard Ave, Providence 5, RI

Kaukauna UNIVERSAL AND HORIZONTAL DRILLING AND TAPPING Machines



WRITE FOR COMPLETE CATALOG

KMC

Kaukauna MACHINE CORPORATION

KAUKAUNA, WISCONSIN, U. S. A.

Low-Cost Rivet Speeds Fastening

The "Pop" rivet, so called because of the speed with which it can be applied to the work, was developed in England, and is now being manufactured here. Rivet handles blind spots as easily as open sections, and can be driven without a dolly by inexperienced operators at a rate up to 1200 per hr.

Fastener, which can be used on most available metals and alloys, consists of the rivet itself, and an inserted mandrel of high-strength steel. Mandrel, which looks like a finishing nail, with its attached rivet, is slipped either into pre-drilled holes in work, or into the fastening tool and then into the hole. Fastening tools can be operated manually and pneumatically; can be fitted with interchangeable heads and extensions to operate at any desired angle or position.

Monel rivets (also available in aluminum) are available in sizes from 7/64-in. up to 3/16-in. dia, and in lengths from 0.190 in. to 0.750 in. In price, they range from $4.73 to $22.84 per thousand in these sizes.

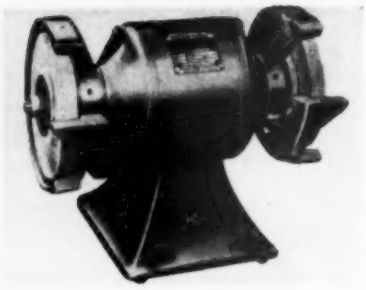
J C Rhodes & Co, Branch of United Shoe Machinery Corp, New Bedford, Mass

Steelast Coating Available In Wide Range of Colors

Stainless steel coating, called Steelast, is now being manufactured in colors, including black, white, gray, ivory, green, red, orange, and yellow. The finish is said to be impervious to moisture, resistant to most chemicals, odorless, and non-toxic when dry.

Applications include protection and finishing of metal surfaces on original equipment, and maintenance of machinery, pipes, tanks, duct work, and metal building materials. Product, which can be sprayed, brushed, or dipped, withstands constant wet heat up to 180 F and constant dry heat up to 300 F.

Steelcote Manufacturing Co, St Louis, Mo



New Line of Bench Grinders

Series of four new models of Porter-Cable bench grinders is available.

Model 116 is a ¼-hp, double-arbor, 6-in. lathe-type unit designed for use in small shops. Takes 6-in. by ⅜-in. grinding wheels, with ½-in. bore. Price, $41.

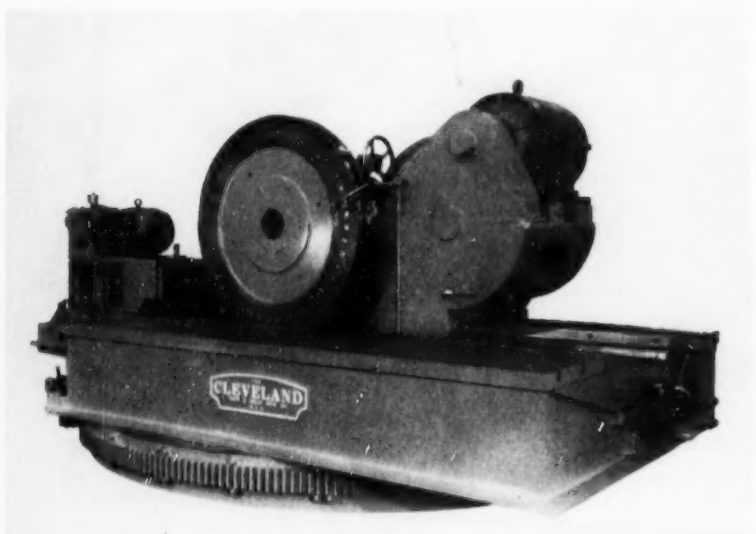
Model 517 is a 1/3-hp unit taking 7-in. by ¾-in. wheels with ½-in. bore. Price, $72.

Model 518, heavier duty version of 517, is a ½-hp machine taking 8-in. by 1-in. wheels with ⅝-in. bore. Price, $102.

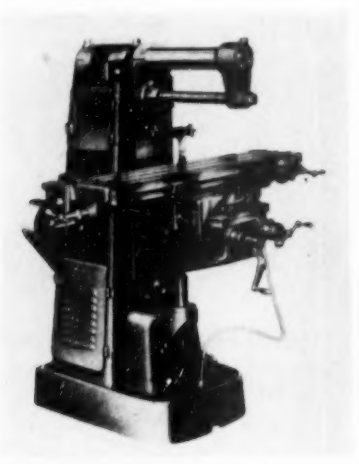
Model 519, largest in the line, is built for continuous duty. It has a 1-hp motor, takes 10-in. by 1-in. wheels with ¾-in. bore. Price, $135.

All grinders have totally enclosed motors with dynamically balanced rotors to assure vibrationless operation. All run at 3450 rpm, except the largest model, which turns at 1750 rpm. Standard equipment includes a fine-grit and a coarse-grit wheel, tool rests, and three-wire cord.

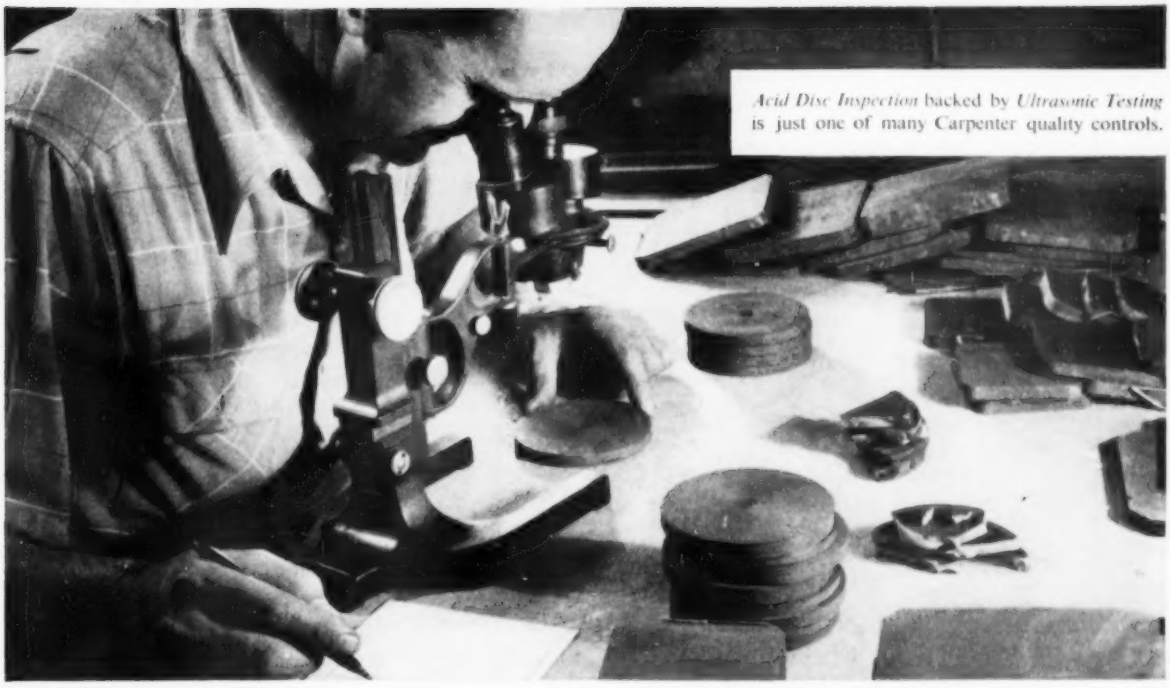
Porter-Cable Machine Co, 14 Exchange St, Syracuse, NY



Cleveland No. 3 rotary planer for milling structural members and castings has a 48-in. cutter head with a 4-in. in-and-out adjustment made from either side of the carriage, by handwheels. Equipped with a hydraulic feed, operated by electrical control, for travel of cutter head. Planing length is 7 ft 6 in. with feed from 1 to 10½ in.; cutter head operates at 50 fpm. Machine can be furnished with various diameters of cutter heads for specific needs, and with length of bed and table to suit requirements.—*Cleveland Punch & Shear Works Co, Cleveland, Ohio*



Hero milling machine, plain or universal, has been re-designed to incorporate a larger table. New unit has a 39½ x 9¼-in. table, and six longitudinal power feeds; anti-friction bearings; 12 spindle speeds, 6 table feeds, and 2½-hp motor.— *Morey Machinery Co, Inc, 410 Broome St, New York*



Acid Disc Inspection backed by *Ultrasonic Testing* is just one of many Carpenter quality controls.

IF YOU USE TOOL STEEL, THESE ARE FACTS YOU SHOULD KNOW

When you make or use a tool or die you invest a sizable sum of money. And there are steps you normally take to protect your investment. You make sure the design is right. You follow through with accurate toolmaking and correct heat treating. But there is *one* factor involved in the success of your die, over which you have only indirect control. That factor is the *soundness* of the die steel you start with. After all, if the steel itself isn't right, you needlessly risk your entire investment.

How can you be *sure* the die steel you use has what it takes to assure good tools? The answer lies in the painstaking controls regularly practiced by the steel manufacturer. Listed here are the four important tool steel controls pioneered by Carpenter to give steel users like yourself the protection you need. Before you place that next tool steel order, ask yourself, "Does our steel supplier guarantee these four quality controls in the die steel we use?" Then remember: You can be *sure* of them when you specify Carpenter Matched Tool and Die Steels. And you don't pay anything extra! THE CARPENTER STEEL COMPANY, 109 W. Bern St., Reading, Pa.

4 Tool and Die Steel Developments *Pioneered by Carpenter*
Help Carpenter Customers Cut Costs, Improve Die Performance

Since 1929:
HOT ACID DISC INSPECTION has been standard practice at Carpenter. To Carpenter customers it provides full assurance that Matched Tool and Die Steels are internally sound, shipment after shipment.

Since 1930:
The TOUGH TIMBRE TEST has assured Carpenter users a wider safe hardening range, greater dependability in performance.

Since 1933:
The TORSION IMPACT TEST has provided Carpenter Matched Tool and Die Steel users with more complete heat treating information that leads to better tools and dies.

Since 1940:
The CONE TEST, used to check and control hardenability of Carpenter water-hardening Matched Tool and Die Steels, has made sure that sections of the same size have uniform hardness penetration in lot after lot.

Carpenter STEEL — Matched Tool and Die Steels

Export Department: The Carpenter Steel Co., Port Washington, N.Y. — "CARSTEELCO"

Mill-Branch Warehouses and Distributors in Principal Cities Throughout the U.S.A. and Canada

OUT OUR WAY

NO, NOBODY PUSHED ME--IT WAS JUST A SLIPPERY SPOT--THERE WASN'T A SOUL NEAR ME!
THAT JUST GOES T'PROVE HOME-OFFICE GUYS ARE HUMAN AFTER ALL! THEY CAN BANG THEMSELVES UP AS EASY AS US ORDINARY MORTALS!
SOME GOOD OUGHTA COME OF THIS, THOUGH! I'LL BET TH' BOSS HAS A DOZEN BAGS OF SOL-SPEEDI-DRI IN HERE T'MORROW!
VISITING BRASS
J.R. WILLIAMS

Industry's favorite floor "dry cleaner"

SOL·SPEEDI·DRI

No idle statement, that! For industry buys more Sol-Speedi-Dri than any other oil and grease absorbent. That's because pound for pound, dollar for dollar, Sol-Speedi-Dri gives *more for the money*, all factors considered. "Dry cleaning" with Sol-Speedi-Dri is *your* best way to keep floors clean and slip-proof. Send coupon today for free sample and literature.

SPEEDI-DRI CORP. 210 W. Washington Sq., Philadelphia 5, Pa.

Warehouse stocks maintained in principal cities of the United States and Canada.

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Inquirers in New York, New England, and New Jersey should write to Speedi-Dri Corp. Elsewhere in U.S. to Waverly Petroleum Products Co., 1724 Chestnut St., Phila. 3, Pa. In Canada, G. H. Wood & Company Ltd., Toronto. Branches throughout Canada.

FREE SAMPLE Fill out the coupon and mail today for free sample and literature.

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City _____ *State* _____

AM-5-11-53

Automatic Stud Puller and Chuck Saves Removal, Replacement Time

Keyless automatic stud puller and chuck has been developed by All Purpose Tool Co for drillpress work, milling machines, lathes, portable reverberating machines, for stud extracting and setting.

Steel tool is said to eliminate 93% of stud bolt breakage because of its dead center pull; bolts remain unmarked and clean for reuse.

Lightweight tool is available in several sizes, ranging in price from $14.95 to $39.95.

Faver, Inc, 770 South Second West, Salt Lake City, Utah

Lightweight Thor Electric Drill

A ¼-in. copper line electric drill with pistol grip operation has been added to the Thor line.

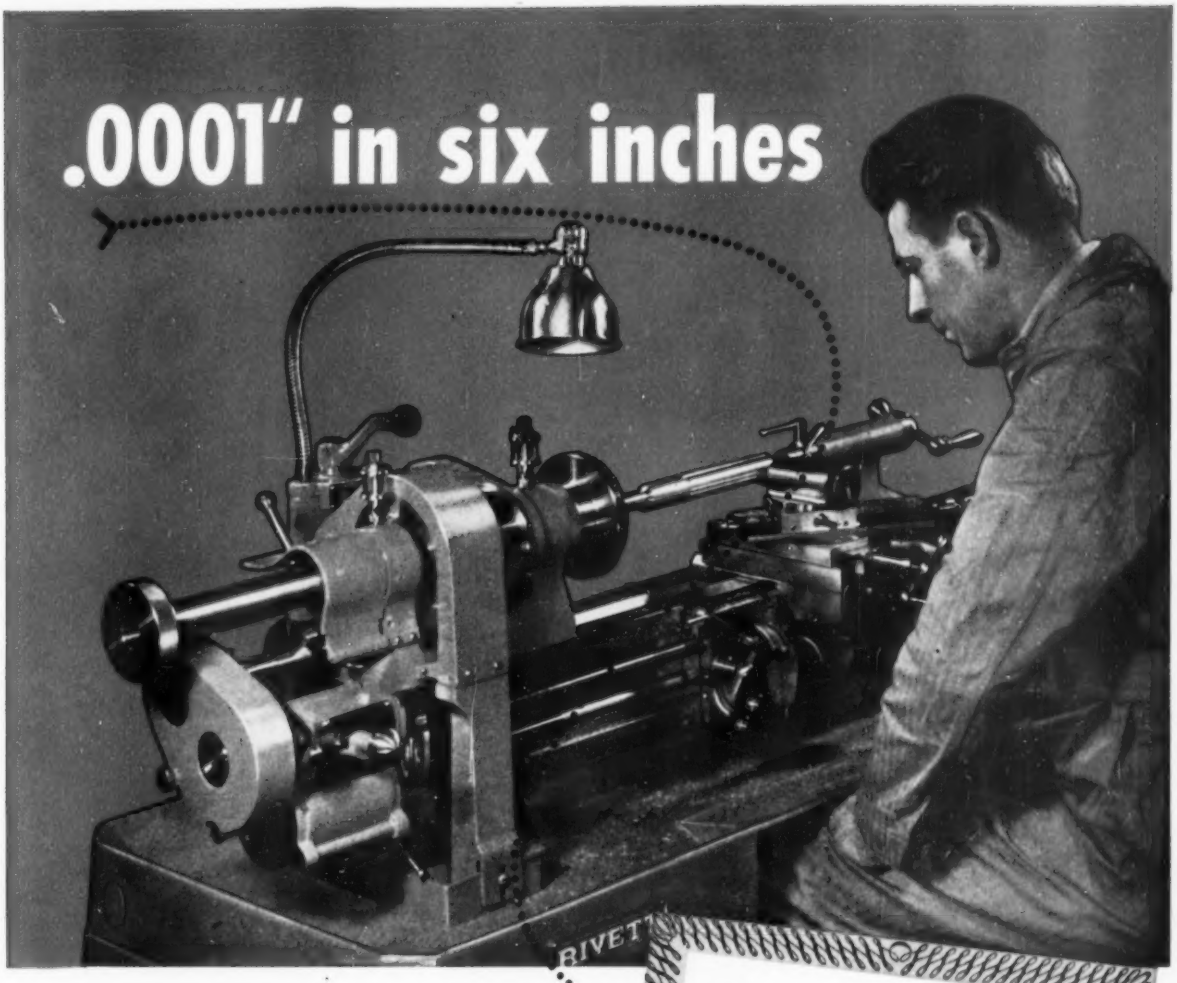
The low-priced tool weighs 2¾ lb, measures 7⅝ in. in length. Handle and field case are cast in one piece for added strength; monetary switch has trigger lock pin for continuous operation.

Drill is available with either geared or keyless chuck; boss is provided on gear case behind chuck for mounting in drill stand.

Independent Pneumatic Tool Co, Aurora, Ill

New, Low-Cost Process Separates Impurities from Diamond Powders

A low-cost process has been developed for the separation of fused alumina of all kinds from diamond powders.



PLUS every known attachment!

A symbol of extreme accuracy for years, this Rivett 608 lathe is used in nearly every instrument and tool shop where fine exacting work is performed. A greater number of modern mechanical marvels have been developed on this small lathe than on all other machine tools combined.

But the 608 is not just a single-purpose tool — it is a small but exceedingly powerful back-geared, screw cutting engine lathe. It has slide areas equal to those of other lathes twice its size — its bronze-bearing spindle guarantees finish and perfect roundness for all work turned. Finely-made attachments for milling, spiral-cutting, slotting, relieving, taper turning, radius turning, grinding, and forming enable the user to complete his entire series of operations utilizing the inherent precision of the lathe itself.

GUARANTEE

The Rivett 608 will turn or bore within 0.0001" in six inches work held in collet, and turn between centers within 0.0001" in six inches. The Rivett 608 will face to eight inches diameter within a limit of 0.0002" concave, 0.0000" convex. The Rivett 608 will cut threads within 0.0005" in twelve inches, or within 0.0003" in any three inches, or within 0.0002" in any inch of a specimen piece.

You'll be adding your name to a prominent list of users by installing a 608 Rivett. For a more detailed story, write for Bulletin 608F.

RIVETT LATHE & GRINDER, Inc.

Dept. AMR5, Brighton 35, Boston, Massachusetts

For More Precision Work RELY ON RIVETT LATHES AND GRINDERS, The Master Craftsman's Master Tools

The right combination counts ... in grinding wheels too!

SIMONDS ABRASIVE CO.

Grinding Wheels

Simonds grinding wheels have the right combination to put *you* in the 'chips' . . . the quality controlled combination of grain size and bond strength to stack up production . . . the sure combination for economical grinding, fast stock removal and long wheel life. Complete line includes everything for roughing, finishing, cutting off, polishing and sharpening. Whether *you* need grinding wheels, mounted wheels and points, segments or abrasive grain . . . you'll find Simonds your best deal for best results.

Write for free data book and name of your Simonds distributor.

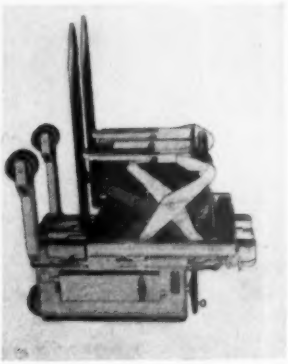
SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON

DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y., Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co. Ltd., Arvida, Que.

Method permits separation of these impurities within a limit of about 2% of the original content in a single operation, and closer when performed in several stages. The same process, with slight changes, is said to be effective for separation of silicon carbide, and for treating fine powders.

Gubelin International Corp, 35 W 53rd St, New York, NY

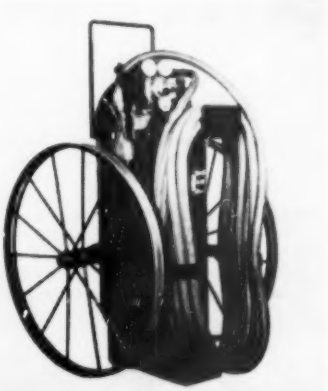


Electric Tiering Truck Designed for Narrow Aisles

Raymond Reach-Fork electric tiering truck has been especially designed for narrow storage aisles. It can right-angle tier from any 6-ft aisle because of its fork action, short length, and off-set drive wheel with 200° turning arc. Forks extend 24 in. and back in a few seconds' time.

Unit has a 51-in. free lift for elevating loads in low-ceiling areas. The 2000-lb capacity model has a standard 12-v battery which slides in or out on built-in rollers.

The Raymond Corp, 47 Madison St, Greene, NY



One-Man Fire Fighter

Model 150 wheeled engine for fighting B and C fires has a capacity discharge of 150 lb of Alfco quick-smothering dry chemical. The 480-

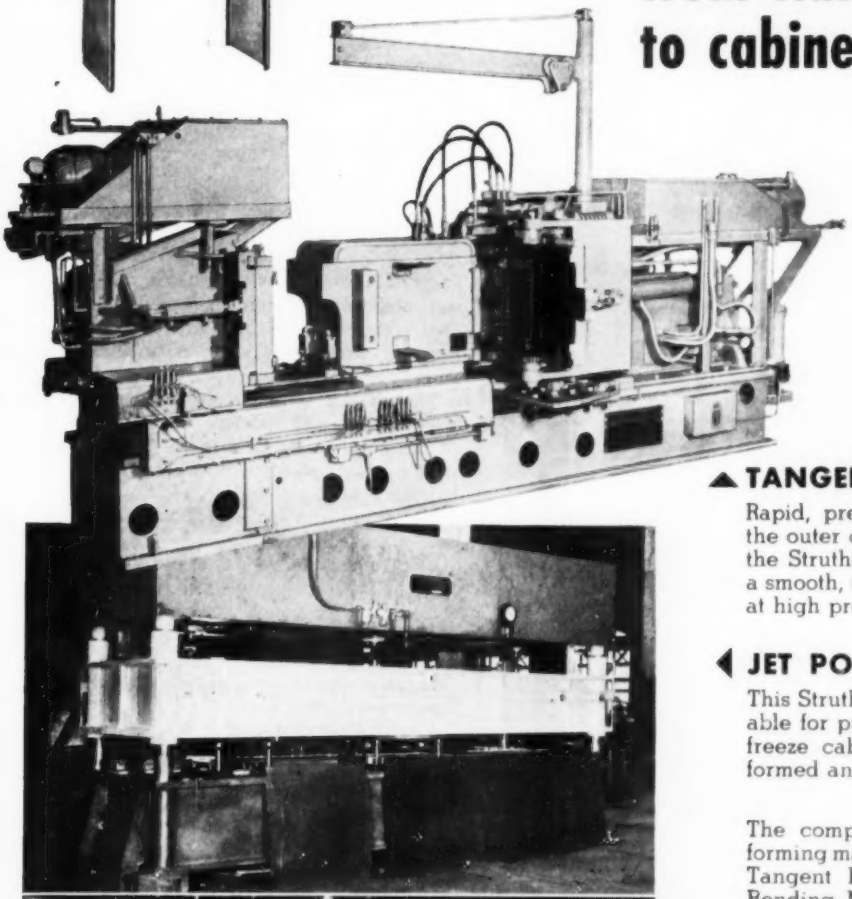
Deepfreeze profits with

DIVISION OF MOTOR PRODUCTS CORP.

Struthers Wells

SHEET METAL FORMING EQUIPMENT

from flat sheet to cabinet wrap-around



▲ TANGENT BENDER

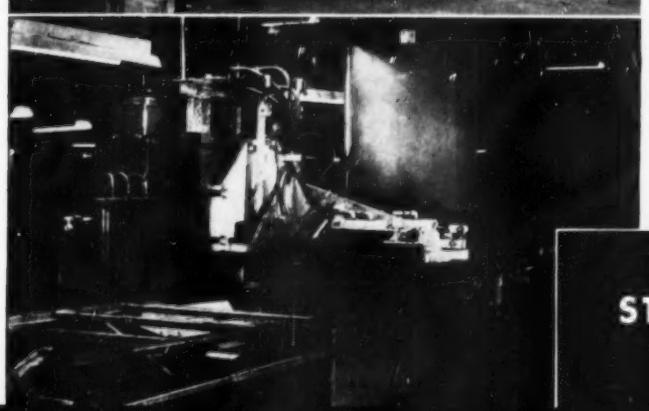
Rapid, precision bending of flanged sheets to form the outer cabinets of Deepfreeze units is provided by the Struthers Wells Tangent Bender, which delivers a smooth, finish-formed product in one operation, and at high production rates.

◀ JET POWER HYDRAULIC PRESS

This Struthers Wells 100-ton notching press is adjustable for production of all models of chest-type Deepfreeze cabinet blanks. After notching, part is roll-formed and moved to Tangent Bender.

* * *

The complete line of Struthers Wells sheet metal forming machinery for the appliance industry includes Tangent Benders, Folding Machines, Roller Table Bending Machines, Sheet Stretch Benders, Tumble Die Bending Machines, and Press Brakes. Write for full information on the equipment in which you are interested.



◀ Struthers Wells Tangent Bender Model 36-DX-3 at work in Deepfreeze plant, showing forming of chest-type wrap-around. 7, 12 and 16 cu. ft. wrap-arounds are formed on one machine.

MACHINERY DIVISION

STRUTHERS WELLS CORPORATION

TITUSVILLE, PA.

Offices in Principal Cities

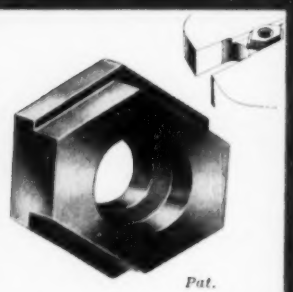
Here are the KEYS to

MORE PRODUCTION

VLIER FIXTURE KEYS

In these simple tools you find the answer to eliminating fixture and key rework, faster production and less idle machine time.

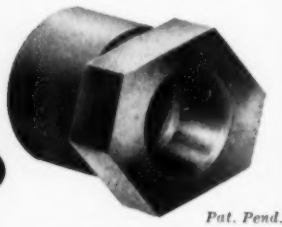
VLIER *Multi-dimensional Fixture Keys are counter-bored nuts that are milled to different cross-dimensions. With these keys on your fixtures, a job can be worked on any idle machine without loss of time. Accuracy is guaranteed to ± .0005" and there is a type to meet your needs in the VLIER line.*



Pat.

MILLED SLOT FIXTURE KEYS

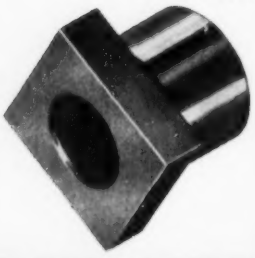
This type is designed to fit all standard table slots. Since each key fits three table slot dimensions, many combinations are possible. To use, simply loosen cap screw, rotate to desired dimension, tighten and you are ready to go. Available in six sizes or special sizes on request.



Pat. Pend.

REAMED HOLE FIXTURE KEYS

For use where the economy of reamed hole installation instead of milled slots in the fixture is desired without sacrificing accuracy. Supplied in four sizes and three types . . . hex, rectangular or square.



VLIER *Fixture Keys are widely used throughout all industries. It will pay you to investigate their money-saving possibilities.*

Send for Catalog No. 52

VLIER ENGINEERING, INC.

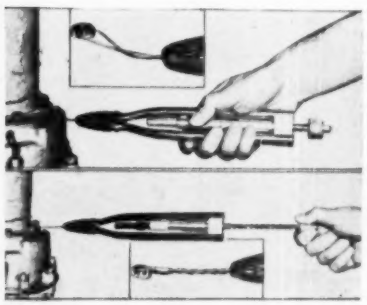
4552 BEVERLY BLVD., LOS ANGELES 4, CALIFORNIA

Distributors of Spring Plungers, Torque Thumb Screws, Toggle Pads, Spring Stops.

lb unit is designed for one-man operation. Discharge range of from 20 to 25 ft enables operator to move up quickly on the fire without effect from heat.

Sustained operating pressure of 200 psi can be maintained during entire period of discharge, which can be accomplished in 45 seconds, if necessary. Nozzle lever can be opened or closed as desired.

American-LaFrance-Foamite Corp, Elmira, NY



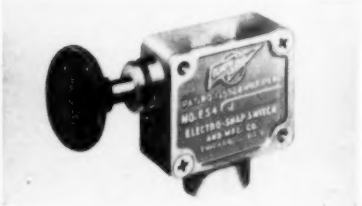
Triple-Action Wire Twister

Robinson wire twister has been developed for safety wiring of aircraft engines, carburetors, magnetos, radar, and radio equipment. It is said that average assembly line workers can wire three engines in the time formerly required to do one.

The device operates as a pliers, wire cutter, aud twister. Two ends of the wire are gripped in the jaws; center rod is slipped down, locking handles; knob is pulled, spinning the pliers to produce a uniform twist in the wire.

The 1-lb, 12-in. model is designed for full assembly line production; 9-in. size is for bench work on small equipment. Prices are $19.50 and $18.50, respectively.

Ralph C Robinson Co, Box 494, North Sacramento, Calif



Limit Switch Action Eliminates Need for Relays

ES4-J limit switch has been designed to permit more inexpensive circuit controls by minimizing need for relays in automatic sequencing or interlock operations. Available with

either constant or one-way momentary contact action.

Unit has an electrical rating of 10 amp at 125 v ac; it is furnished with a single-pole, double-throw circuit arrangement only. Mounting is extremely versatile, and switch is easily wired into a circuit through a standard industrial conduit connection.

Electro-Snap Switch & Manufacturing Co, 4218 West Lake St, Chicago, Ill

Gurley Optoplane Speeds Jig And Fixture Alignment

New industrial model of the Gurley Precise Transit for facilitating jig and fixture location and alignment has been added to the company's line.

The Optoplane establishes the horizontal and vertical planes necessary in locating and setting up jigs for sectional assembly; unit permits alignment and coordination within tolerances of thousandths of an inch.

Because angles are unnecessary in jig assembly, the new instrument does not incorporate a vertical circle or horizontal limb. Telescope magnifies 22 X, 1.3° field view; minimum focus is 3 ft.

W & L E Gurley, Troy, NY

Diamond Abrasive Paste

Diamond powder compounded in an oily material is available in the form of a paste for lapping and polishing.

Use of paste enables work to be thoroughly cleared by application of water for inspection during and upon completion of lapping, polishing or cutting operations. Salvage of used diamond powder is simplified, since on dissolution of the paste with water, diamond powder together with abraded metallic particles can be readily collected and the diamond salvaged.

Paste is fully soluble or dispersi-

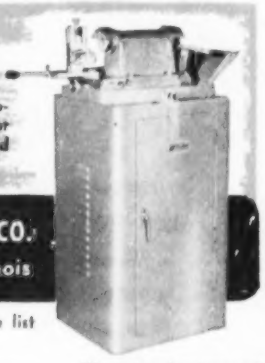
. . . they're gems for
ROUGH JOBS!
UNITED STATES DIAMOND WHEEL CO.
UNITED STATES DIAMOND WHEEL CO.
Specialists in Resinoid and Metal Bonded
DIAMOND WHEELS

U. S. Diamond Wheels are famous throughout industry because they are the finest wheels for production tool maintenance . . . highest quality at competitive prices . . . every wheel production-guaranteed.

USE THEM TO LOWER YOUR OVERHEAD

Extra-long high performance. Rapid stock removal. Perfect "spark-out" on large diameter cutters. Faster cutting action. Maximum economy of carbide removed per dollar of wheel cost.

Our Model CH-105A CARBIDE TOOL GRINDER has proved its dependability and economy in years of hard service. Floor model with eye-appealing cabinet enclosing coolant system. High shaft speed for efficient small diameter wheel use. Two diamond wheels for offhand and chipbreaker grinding.



UNITED STATES DIAMOND WHEEL CO.
835 Illinois Avenue, Aurora, Illinois

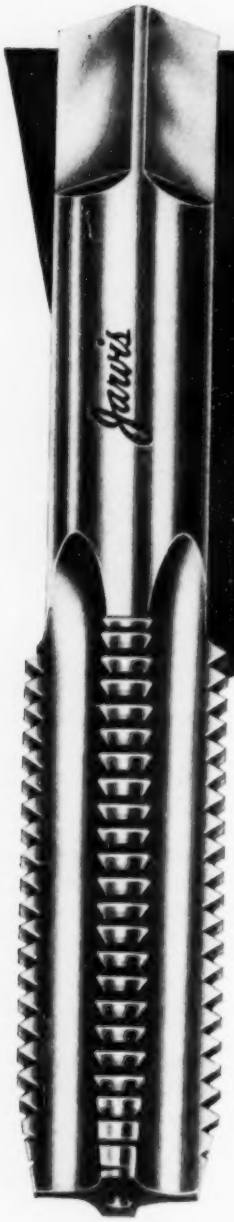
• Send me your new illustrated catalog price list of diamond wheels and grinders.

Name_____

Company_____ Title_____

Street_____ City & State_____

We manufacture all products bearing United States Diamond Wheel name or trademark.



Jarvis TAPS

AN INDUSTRIAL TAP FOR INDUSTRIAL USERS

have "Custom Made" Cutting Edges at NO EXTRA CHARGE

"Custom Made" means just that! Accurate indexing and precision machine grinding of flute and spiral points on Jarvis Taps produce a tool in which ALL the cutting edges do their share of the work. Our highly accurate fluting process makes it possible for us to control for your PARTICULAR NEEDS the amount of hook ground in the flutes. Specify Jarvis, and you'll always have "Custom Made" Taps designed to do a specific job superbly well.

JARVIS POWER TOOLS

include:

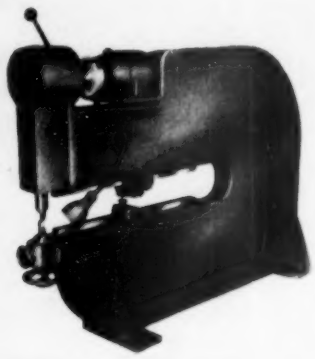
TAPPING ATTACHMENTS
TAPS · FLEXIBLE SHAFTS AND MACHINES
ROTARY FILES
TUNGSTEN CARBIDE REAMERS AND MILLS
DRILLS · BORING BITS

Send for complete Tap Catalog now—also name of your nearest Jarvis representative.

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT

ble in water, and shows no tendency after a prolonged period of working to dry out, or to be so viscous as to be unworkable. Product has good adhesion to the workpiece. Since paste is colorless or white, it can be colored so that the micron size of the diamond powder abrasive may be designated by a specific color.

Glyco Products Co, Inc, Brooklyn, NY



All-Purpose Unit for Plate and Sheet Working

Universal plate and sheet working machine, developed by GV Nibbler Co of Sweden, performs beading, straight cutting, folding, joggling, circular and slot cutting, nibbling, irregular or free-hand cutting, and louvering; tools are easily changed and installed. Unit is designed to cut practically any material within its capacity, such as mild steel, stainless, aluminum, brass, and copper.

Cutting capacity on the Junior model is ⅛ in.; Medium model, 15/64 in.; Senior model 5/16 in. Throat depths are 28½ in., 40 in., and 49 in. Delivered complete with electric motor for 220 or 440 v, 60 cycle, 3 phase. Circle and straight cutting tools, folding and beading tools, adjusting gages, and spanner are included.

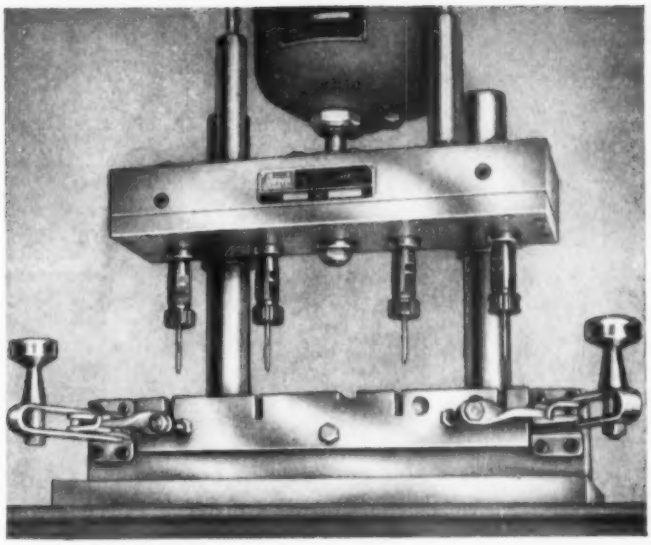
Imported by Eric S Johnson Co, 230 E Ohio St, Chicago, Ill

Ammonia-Type Whiteprinter

Speed Master Model S ammonia-type whiteprinter is on the market for printing and developing black line and colored line whiteprints in volume. Duplicates anything drawn, written, typed, printed, or photographed.

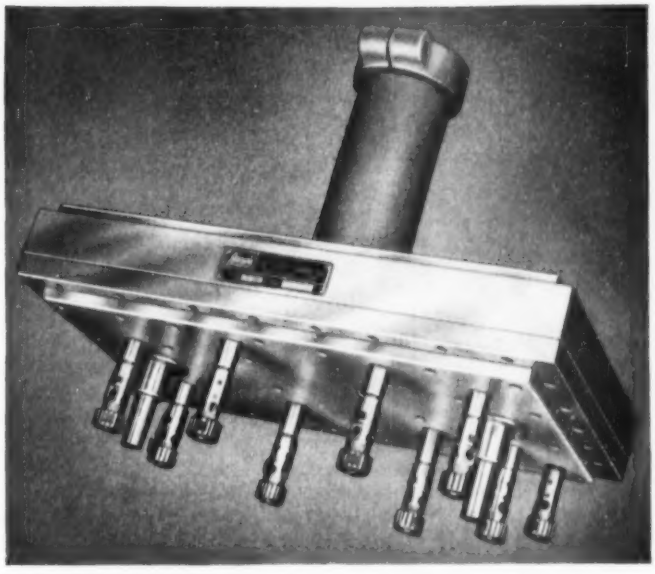
Printing speed is from 6 in. to 14 ft per minute; develops fully at 8 ft per minute. Handles cut sheets or roll stock up to 42 in. wide in any length; front delivery and control. Separate switch gives quick control

For Multiple Tapping and Drilling . . .



AN INDUSTRIAL MACHINE FOR INDUSTRIAL USERS

Jarvis MULTI-TAPPERS



Engineered and built to your specific production requirements from our basic standard components, Jarvis Multi-Tappers can be furnished for any type of drill press available.

We invite your inquiries—let us assist in analyzing your tapping and drilling needs!

Send for our catalog featuring Jarvis Multi-tappers

NEW FEATURES OF JARVIS MULTI-TAPPERS

include:

- Aluminum case—Jig bored.
- Gear driven—positive action, silent drive.
- Ball bearings throughout.

WHEN POWERED WITH A JARVIS TORQOMATIC DRIVE THE JARVIS MULTI-TAPPER PROVIDES THE MOST EFFICIENT AND PRODUCTIVE MACHINE IN THE FIELD.

THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT

ELECTRO DYNAMIC
Extra dependable industrial motors
1 TO 250 HORSEPOWER (N.E.M.A. STANDARDS)
Extra large "free-flo" air channels.
Liberal size grease lubricated bearings.
One-piece cast iron frames.
Permanently aligned cast iron brackets.
Also a complete line of Direct Current motors and generators
ELECTRO DYNAMIC
DIVISION OF GENERAL DYNAMICS CORPORATION
BAYONNE, NEW JERSEY
HEART of the motor
3. Extra high-frequency testing of insulation between turns.
4. Extra care in fitting coils into stator.
The WINDING is the
1. Extra insulation in stator slots and between phases.
2. Extra impregnations and bakings of the wound stator.
QUALITY SINCE 1880
WRITE TODAY FOR NEW ILLUSTRATED CATALOGUE NO. 569

of ammonia-fume venting blower, which can be left on at all times.

Unit is 68 in. wide by 24 in. deep by 62 in. high; occupies 11 sq ft of floor space. Equipped with a 220-v, single-phase 60-c ac motor. Price $1565.

Peck & Harvey, 5650 N Western Ave, Chicago, Ill

Punch Press Safety Guard

Benchmaster barrier-type punch press guard is designed to provide maximum operator safety regardless of die used. Low-cost unit fits all Benchmasters, as well as other presses.

By dropping vertical rods through any pair of pre-located holes in horizontal guard plates, a protective cage is set up around the die area. Practically any shaped contour can be formed by varying height and position of rods in the guard plates; small clips hold the rods at desired heights. Openings in the guard can be arranged to permit parts to be inserted or ejected from the die. Can be used in conjunction with sweep, pull-out, and two-hand trip guards.

Benchmaster Manufacturing Co, 1835 W Rosecrans Ave, Gardena, Calif

New Metal Produces Parts With High, Permanent Luster

A new metal, called Lurium, developed in West Germany, is available in this country for fabrication of lightweight metal parts with a permanently lustrous high finish, said not to tarnish even when submerged in salt water.

Lurium, one-third the weight of brass or copper, is alloyed with varying percentages of magnesium for different applications. It is a work hardening alloy, easy to fabricate, and may be anodized and dyed in

Superior Type 430 Stainless

for heat applications

resists oxidation

does not corrode

fabricates easily

stays strong and tough

In the broad electric heating field, from domestic ranges to heavy-duty industrial units, Superior 430 Stainless enjoys time-tried favor. ● Used for trim rings, coil supports and medallions of range elements, this sturdy steel stays bright, stands up to heat, resists abrasion. As sheathing for high-temperature strip, ring, tubular and cartridge heaters, Superior 430 Stainless fabricates smoothly, easily and resists corrosion.

● Our 430 Stainless is available in easy handling coils. *Write!*

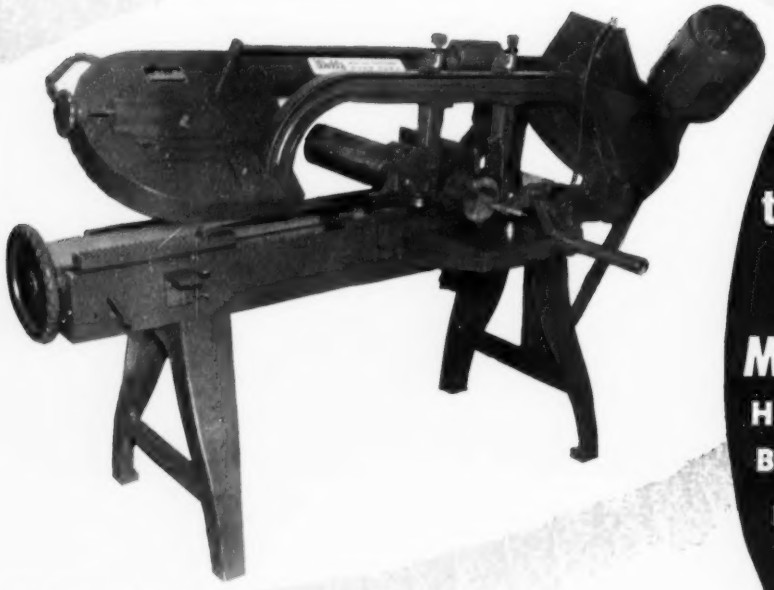
Superior Steel

CORPORATION

CARNEGIE, PENNSYLVANIA

Announcing

THE *NEW* WELLS Model 800 Horizontal Metal Cutting BAND SAW



Approved for use with the revolutionary *NEW* MILFORD REZISTOR HIGH SPEED STEEL BAND SAW BLADE

Designed for production cut-off work, particularly for cutting stainless steel

THE NEW WELLS MODEL 800 is the first metal cutting band saw designed to capitalize on the remarkable advantages, and to be approved for use with the new MILFORD REZISTOR High Speed Steel Band Saw Blade.

Model 800, engineered for heavy duty work, provides for practical and efficient use of blades of 1" in width, especially the new High Speed Steel Band Saw Blade. This blade, used with Wells Model 800, has established new records . . . higher level of cutting efficiency . . . more cuts per blade.

Wells Manufacturing Corporation has been authorized by the producers of this new blade to supply complete information, and would be glad to study your metal cutting jobs to determine which blade, when used with Model 800, will show you cost savings in your cut-off operations.

DESIGN FEATURES

- Exclusive new Wells "constant-load" blade tensioning device.
- Extra rigid, heavily built counterbalanced frame and beam.
- New style band wheels.
- Synchronized speed blade cleaning brush.
- Improved, special heavy duty blade guides.
- New expanded range of cutting speeds.
- Capacity: 8" diameter.

Wells SAWS

Wells

The Pioneers of Horizontal

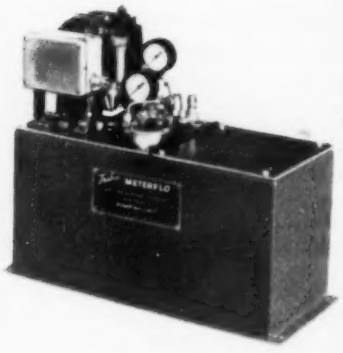
METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
505 ROOSEVELT RD., THREE RIVERS, MICH.

any color to simulate gold, silver, platinum, copper, brass, or any alloy. Material cost in finished form is said to be less than any of these metals.

It is available in raw mill forms in all standard shapes, sheet, coils, strips, bars, tubes, wire and extrusions, in soft, half-hard, and hard tempers. Companies who prefer to finish the metal in their own plants may do so under licensing arrangement with the importers.

Imported by Fromson Orban Co, Inc, 205 E 42nd St, New York, NY



Oil Circulating System

Oil circulating system, known as Meterflo, utilizes the Trabon positive displacement principle for controlling flow of oil to every bearing under pressure.

RTP-2000 series rotary pump units are available in complete range of discharge capacities; flow rates up to 80 cu in. per minute. Units with or without sumps include motor, pump, hi-lo dual acting pressure switch, cartridge filter, pressure gages, oil level gage, and fill screen. MXO and MO metering valves control flow of oil to each bearing.

Trabon Engineering Corp, 1814 E 40th St, Cleveland, Ohio

Panalarm adapter unit permits remote visual trouble signals to operate as part of a common, plant-wide audio-visual annunciator system. Either individual back-lighted illuminated nameplate units, or bullseye lamps are furnished for scattered locations on panel-boards, or operating locations in the plant. All signals connect to a common horn or bell which must be acknowledged by operator when an off-normal condition develops.

Panalarm Products, Inc, 6312 N Broadway, Chicago, Ill

SALVAGE 95%
...of unproductive tool-change time

"Get Greater Precision, End Chewed-up Shanks"

"Eliminate Keys, Collets and Wrenches"

TO OPEN—Grip sleeve, pull down; jaws open automatically and tool is released.

TO CLOSE—Insert new tool, grip tapered part firmly; tool is locked in place.

Equip your drill presses, boring mills, jig borers, milling machines, lathes with

AMF WAHLSTROM *fully automatic instant change* CHUCKS

SAVE TIME—Changing tools in an AMF Wahlstrom Chuck takes only 2 or 3 *seconds—not minutes!* No waiting for the spindle to stop! No hunting for keys, collets or wrenches! Four hardened and ground jaws automatically center the tool and provide a grip that can't slip, can't chew up shanks. The greater the load, the tighter the grip!

SAVE MONEY—With AMF Wahlstrom Fully-Automatic Chucks on your machines, as much as 95% of the time usually wasted in changing tools can be converted into *productive* time—time that adds up to many hours per month . . . per operator.

SAVE CAPITAL INVESTMENT—A single spindle equipped with an AMF Wahlstrom Chuck does the work of *several* spindles . . . makes it practical to drill, ream and counterbore many different size holes successively, *without moving the work.* Model "A" (shown) available in two capacity ranges: 1/64" to 3/8" and 1/32" to 1/2". Other models for larger tools.

Ask your local industrial or machinery distributor for demonstration or write us direct for illustrated folder.

WAHLSTROM/FLOAT-LOCK SALES DEPT. (AM-3)
AMERICAN MACHINE & FOUNDRY COMPANY, 511 Fifth Ave., New York 17, N. Y.

COMPARE Unretouched Photo

(UPPER) Tool used in Wahlstrom chuck. Note perfect shank. This tool has been repointed 17 times; inserted and removed 289 times.

(LOWER) Tool used in ordinary chuck. Note chewed-up shank. This can happen the *first* time chuck slips.

AMF WAHLSTROM®
CHUCKS AND TAPPING ATTACHMENTS
FULLY-AUTOMATIC

See AMF's exciting, new television show, "OMNIBUS," every Sunday. Check local paper for time and channel.

ACCO products

WILSON "Rockwell"* Hardness Testers

NOW FOR ONLY

$550

(less accessories, F. O. B. Bridgeport)

you can get this

J-MODEL WILSON "Rockwell"

The Best...Costs Less...to Use

• When you use WILSON "*Rockwell*" Hardness Testers to check your products during various stages of manufacture, you will *be sure*. You will prevent costly complaints from your customers. The long experience of WILSON'S Standardizing Laboratory engineers is your assurance of top quality and accuracy in the "*Rockwell*" Testers you buy.

Six Important Features

1 Totally enclosed, dirt and dust-proof "Zerominder" dial gauge
2 Gripsel clamp screw for quick change and proper seating of penetrator
3 All controls grouped conveniently
4 Enclosed, easy-to-reach variable speed dash pot
5 Stainless steel elevating screw
6 Standardized weights

WILSON Makes a Complete Line

There are two types of WILSON "*Rockwell*" Hardness Testers ... Regular and Superficial. They come in many styles with accessories for testing flats, rods, rounds, and odd shapes. For micro-indentation hardness testing, there is the WILSON TUKON.

Write for information and let us make recommendations

*Trade Mark Registered

ACCO

WILSON MECHANICAL INSTRUMENT DIVISION
AMERICAN CHAIN & CABLE

230-B Park Avenue, New York 17, N. Y.

WILSON "ROCKWELL" and TUKON Hardness Testers

Small Electric Furnace Has Varied Applications

Small electric furnace for maintenance and small parts production has been designed primarily for use in hardening of tools and steel parts with Armor-Tuf steel hardening compound. The unit has varied applications, however, including heat-treating, enameling, chemical drying, wax burnout.

Furnace attains a temperature of 1800 F from a wall socket line of 110/120 v ac. Inside dimensions are 4⅜ in. deep by 4 in. high by 9 in. wide. Fully automatic unit is priced at $195.

Armor-Tuf Sales Corp, 299 Madison Ave, New York, NY

Adco Plastic Peel is an improved hot dip strippable plastic coating for protecting tools, gears, and machine parts during processing, storage, and shipping. Thickness of the film deposit is easily controlled.

Adhesive Products Corp, 1660 Boone Ave, New York, NY

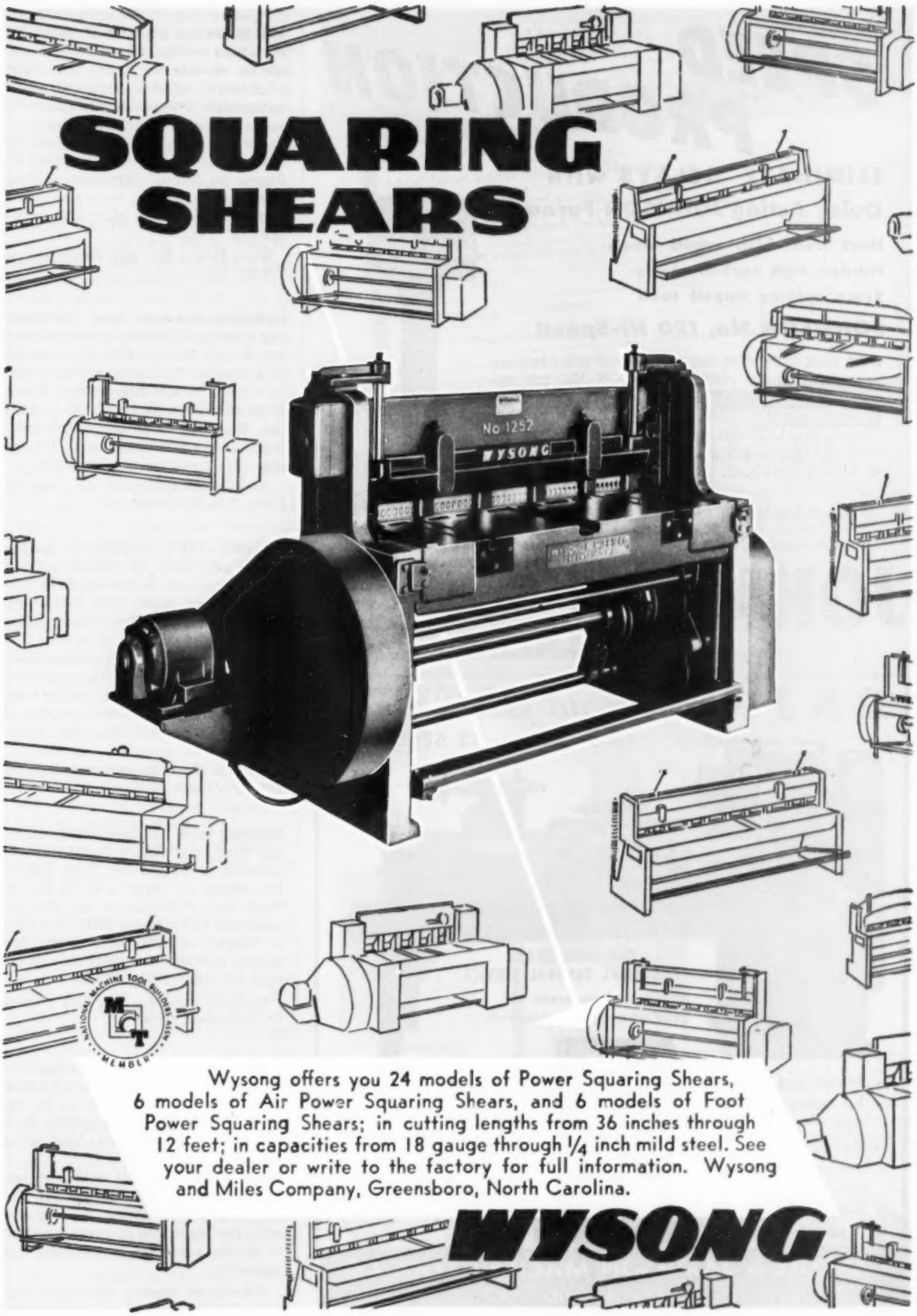
Model 675 Erick Magna-Holder floodlight consists of a heavy duty lamp socket and reflector mounted on an extension attached to a magnetic base. Unit can be attached to any round, flat, or angled ferrous surface; light can be focused in any direction. Price, $8.50.

Cullen Manufacturing Co, Racine, Wis

PCA anti-rust paints are now available in gray, red, and green, in addition to the company's black, clear, and aluminum. Can be painted over rusty surfaces without scraping or use of primer coat, with brush, spray, roller or dip application.

Paint Corporation of America, Fidelity Building, Cleveland, Ohio

SQUARING SHEARS



Wysong offers you 24 models of Power Squaring Shears, 6 models of Air Power Squaring Shears, and 6 models of Foot Power Squaring Shears; in cutting lengths from 36 inches through 12 feet; in capacities from 18 gauge through 1/4 inch mild steel. See your dealer or write to the factory for full information. Wysong and Miles Company, Greensboro, North Carolina.

WYSONG

SPEED PRODUCTION

ELIMINATE DELAYS with
Quick Acting JOHNSON Furnaces

Heat treat high speed steels
Harden high carbon steels
Braze carbide tipped tools

JOHNSON No. 120 Hi-Speed

Heat treat tools, dies and small metal parts in your own plant. Quick Acting JOHNSON No. 120 Hi-speed delivers 1500° F. in 5 minutes, reaches 2300° F. in 30 minutes. Gets the job done fast to save time and gas. Temperatures easily regulated with accuracy. Firebox 5 x 7¾ x 13½. Complete with Carbofrax Hearth, G. E. Motor and Johnson Blower.

$145.50 F. O. B. Factory

There is a Quick Acting JOHNSON Unit for every toolroom and shop. Write for complete catalog. Johnson Gas Appliance Company, 589 E Avenue N. W., Cedar Rapids, Iowa

JOHNSON Since 1901
FURNACES FOR INDUSTRY

C & J *Geared-Head* LATHES

16 INCH • 12 SPEED

FOR HIGH GRADE PRACTICAL GENERAL SERVICE

Guaranteed accurate to good commercial standards.

- Tooled and equipped for efficient production
- Exceptionally long carriage bearing — 23⅜ in.

Write TODAY for bulletin 38-A-8.

ONLY ONE MODEL • ONLY ONE SIZE

- Feed provided by separate rod — lead screw is used only for thread chasing

Complete regular equipment includes thread indicator.

CARROLL & JAMIESON MACHINE TOOL CO.
BATAVIA OHIO

Vibraglass is a shock- and vibration-absorbing resilient board material for use as mounts for heavy and light machinery, electric motors, radio equipment, computing instruments, and as strips in forced-air furnaces. Supports loads of 2000 lb psi at temperatures from −100 to +375 F. Shows no lateral expansion during compression, and recovers completely immediately after load withdrawal.

Glass Fibers, Inc, 1810 Madison Ave, Toledo, Ohio

Hydraulic-powered load stabilizer has been developed as an attachment for Elwell-Parker 6000-lb capacity fork trucks. Clamping pressure can be varied to suit the product being handled within limits of 150 to 1350 psi. Blow-off valve prevents crushing the load due to excessive clamping after pressure has been set.

Elwell-Parker Electric Co, 4205 St Clair Ave, Cleveland, Ohio

Formula 921-T aluminum tooling plate has been developed to cut fabricating costs in making drill jigs, mill fixtures, brake dies, form dies, assembly jigs, hydro-form blocks, and stretch form dies. Fast heat dissipation makes it particularly adaptable for use in welding fixtures. Material, which may be heat treated, is available in standard lengths of 921-T, 96 and 144 in., with 48-in. widths.

Pioneer Tool Engineering, Inc, El Segundo, Calif

Drafting table has been designed for use with an ordinary chair; top, adjustable in height for stool use or for tilting on either side, is 3x6 ft. Unit, with overhang on one side for standard two-drawer letter file, has a hinged palette table with two sliding shelves for supply storage on opposite side. Price, $79.95.

Tectonic Services, Inc, 2074 E 36th St, Cleveland, Ohio

Miniature blower for electronic equipment consists of a scroll which directs flow of air produced by enclosed wheel, and a backplate. Now available in four sizes (indicating diameter of wheel) 1½, 2, 2½, 3. Molded plastic scrolls with high-impact strength and dimensional stability permit thinner wall shells, with resultant loss in overall weight to reduce breakage in handling and assembly.

Electroflow Pumps, Inc, 4811 Anaheim-Telegraph Rd, Los Angeles, Calif

Hydroelectric lift trucks, models KT and KHL are available for combination use to cut handling costs. KT pulls one to six trailers to storage area; KHL picks up palletized loads from trailers and stacks them; empties are picked up in reverse order. Units have high maneuverability in crowded quarters.

Lift Trucks, Inc, Cincinnati, Ohio

Marion HM2ET elapsed time indicator is available in a 2½-in. size for panel mounting. Motor starts and operates continuously at temperatures ranging from –55 to +85 C. Registers in 1/10-hr steps to 9999.9, or hour steps to 99999. Equipped with self-starting synchronous motor, either 110-125 or 220-250 v for 50- or 60-c ac operation.

Marion Electrical Instrument Co, Manchester, NH

Engler AC Hour Log is a precision instrument designed to provide a continuous record of operating and downtime for all machines operating on alternating current. Dust-proof case has interior lighting with an off- and on-switch.

Engler Instrument Co, 250 Culver Ave, Jersey City, NJ

Sectional copy holding slide has been designed to eliminate realignment of work and to permit horizontal engraving of letters and numerals in one continuous operation. Device, which may be used on any model Engravograph with standard ⅝- or 1¼-in. blanks, is said to be particularly useful in marking long bands, such as terminal strips.

New Hermes Engraving Machine Corp, 13-19 University Place, New York, NY

New Brunette rack lifter consists of a pulley with pockets or teeth that grip the chain. Large-diameter end of a shaft is placed in a hole in the wall, pole, or fixed upright, and small-diameter end in a ½-in., or larger, electric drill for raising and lowering.

Industrial Bench & Equipment Mfg Co, Inc, 98 South St, New Britain, Conn

Mark-N-Count is a machine which simultaneously marks and counts items in production, inventory, checking lists, and similar operations. Audible click registers each count; removable pencil is attached for color checking. Unit plugs into a 110-v ac outlet. Price, $87.50.

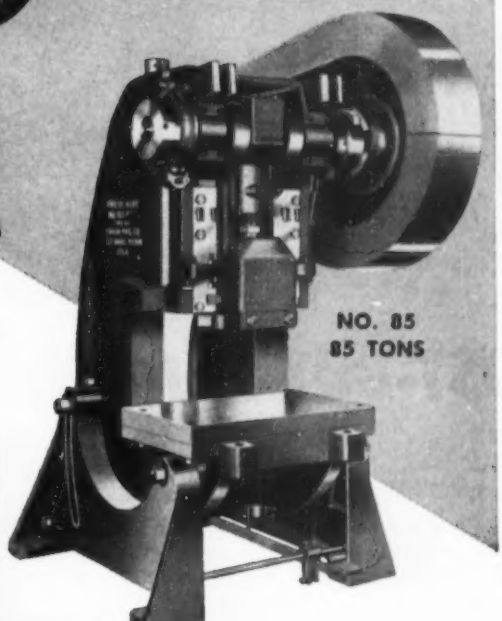
May Engineering Co, 6055 Lankershim Blvd, N Hollywood, Calif

How does YOUR PRESS check out?

STANDARD PRESS FEATURES (at no extra cost)	PRESS-RITE	YOUR PRESS
Uni-Cast Frame	√	
Anti-Friction Roller Bearings in Flywheel	√	
Four Point Engagement Sliding Clutch Key	√	
Automatic Cam Operated Brake	√	
Cam Operated Single Stroke Safety Mechanism	√	
Built-In Tie Rods	√	
Triple Ramway Lubrication	√	
Bronze Bushed Main Bearings	√	
Replaceable Die Shank Bushing	√	
Airflex Friction Clutch (optional at extra cost)	√	

PRESS-RITE
OPEN BACK—INCLINABLE
POWER PRESSES

NO. 60—60 TONS
AIR CLUTCH EQUIPPED



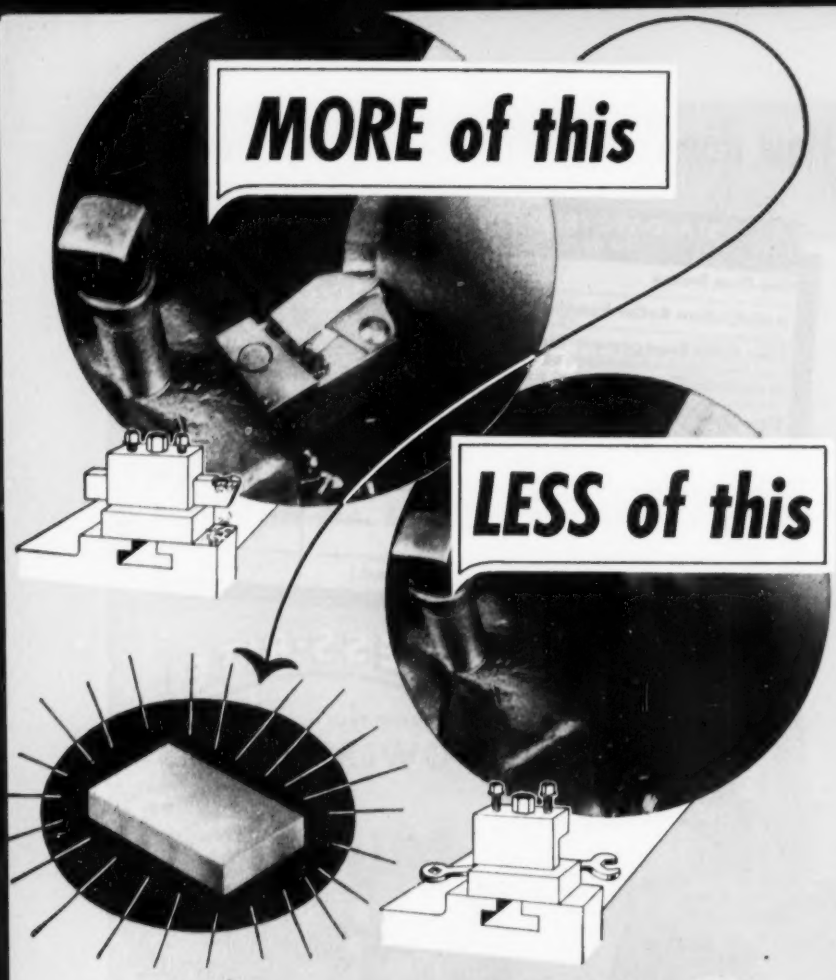
NO. 85
85 TONS

Get all the facts
About Press-Rite Press features, together with specifications. A complete line of 8 models from 5 to 85 tons capacity.

NOW You Get All These Features in *One* Press . . . the Press-Rite Press. Buy Press-Rite Presses today and get increased production . . . longer die life . . . greater operator confidence . . . longer press life . . . and scores of other benefits. Press-Rite Presses help to cut your operating expense and eliminate costly down time. Find out more about Press-Rite Presses today.

Send for Bulletin P552.

Sales Service Machine Tool Co.
PRESS RITE PRESSES • SHAPE RITE SHAPERS • KELLER POWER HACK SAWS
2347 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA



How to Reduce "LOST-BUT-PAID-FOR" HOURS

Shut down of a machine for tool change does not shut off operating expense. Production stops, but costs run on.

There's a way to minimize this non-productive time . . . Kennametal tools seldom need replacement — hours on the machine, minutes being reground.

Kennametal is "different" — ingredients, compositions, processing. The resultant distinctive characteristics are utilized to a maximum degree in novel tool designs — especially the clamped-on technique — in which we pioneered.

How Kennametal reduces Lost-but-Paid-for-Hours is disclosed by case studies in periodically-issued Performance Reports, and can be demonstrated in your own plant. Such information and help is yours for the asking. Kennametal Inc., Latrobe, Pa.

KENNAMETAL
CEMENTED CARBIDE TOOLING
THAT INCREASES PRODUCTIVITY

Clepco-Glorod Series W steel-sheathed immersion heater for alkaline baths has low heat density that protects heater and liquids from damage due to carbonization. When controlled by a thermostat, units are in operation only for the period of time required to maintain desired temperature. Single heater can serve many tanks, side-mounted, or screwed into tank bottom.

Cleveland Process Co, Cleveland, Ohio

Small, right-angle worm drive has been designed to fit shafting from ⅜- to 1-in. dia; there is no external projection of the worm beyond the small housing. Entire assembly can be placed on the shafting without disassembly or drilling of shaft. Manufactured in a reduction ratio of one turn of the universal joint to ten turns of the shaft.

Durant Manufacturing Co, 1945 N Buffum St, Milwaukee, Wis

Crescent line of enclosed cabinets has been introduced for handling and storing parts. Pans or tote boxes form their own shelves when slid into the grooves formed by corrugated sidewalls; corrugations are on 1½-in. centers. Available in a range of capacities to handle a variety of pan sizes.

Crescent Metal Products, Inc, 18901 St Clair Ave, Cleveland, Ohio

Line of low-cost, non-electric permanent plate magnets for removing tramp iron from material carried in chutes, ducts, or on belts is now available in a complete range of sizes. Models 1-H and 2-H Perma-Plate magnets are sail to have a 50% increased magnetic strength. They are Mill Mutual approved for Class A and Class B installations.

Dings Magnetic Separator Co, Milwaukee, Wis

Jiffylite lamp reflector screws into any standard light socket; bulb screws into reflector which screws into light socket. Units are available in 10- and 12-in. dia, priced at $2 and $2.50.

The Jones Metal Products Co, West Lafayette, Ohio

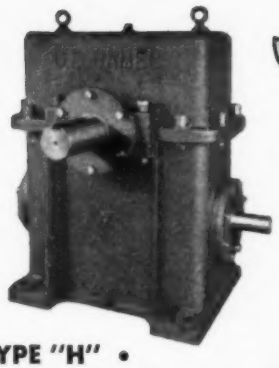
Magnetic sweeper has been designed to remove tacks, nails, and other tramp iron from factory aisles. The Super-Sweeper can be pushed, pulled, or suspended; it is made in

D.O.James

ESTABLISHED 1888

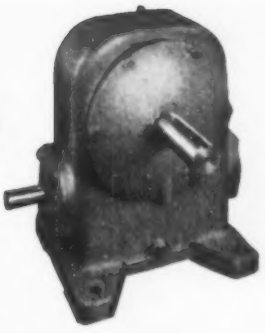
for the Best in

WORM GEARS AND WORM GEAR REDUCERS



TYPE "H" •

Horizontal or Vertical Drive—Each drive type comes in 15 sizes, with ratio ranges of 5.6:1 to 100:1 and from .06 to 206 horsepower.



TYPE "S" •

Horizontal or Vertical Drive—Each type available in 8 sizes, ratio range of 5.66:1 to 100:1 and from .04 to 15.6 horsepower.

MOTORIZED •

Horizontal or Vertical Drive—Each drive type comes in 11 sizes, has ratio range of 5.6:1 to 100:1, with ⅛ to 30 horsepower, driven speeds of 310 r.p.m. to 17.4 r.p.m. Vertical drive slow speed shaft extends either upward or downward.

DOUBLE •

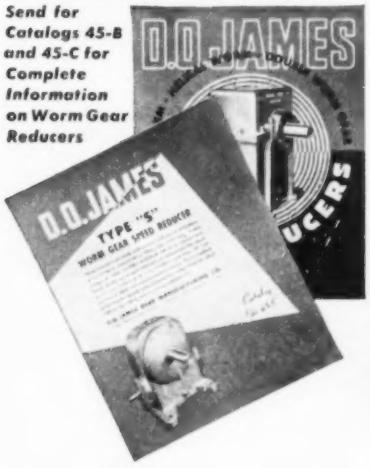
Horizontal or Vertical Drive—Each drive type available in 13 sizes, ratio range of 130:1 to 10000 and from .004 to 59.7 horsepower. Vertical drive slow speed shaft extends either upward or downward.

WORM GEARS

Generated on tangential feed hobbing machines by tapered and ground hobs. Made from 1" to 100" in diameter and from 24 DP to 1 DP.

Catalogs are available to users of Gears and Gear Reducers—containing valuable engineering data, specifications, weights and prices.

Send for Catalogs 45-B and 45-C for Complete Information on Worm Gear Reducers



D. O. JAMES Worm Gears and Worm Gear Reducers are designed and manufactured to have maximum inbuilt strength and to assure dependable *on-the-job* performance. The many and repeated installations of these reducers testify to their operating superiority and adaptability.

D.O.James GEAR MANUFACTURING COMPANY

1140 WEST MONROE STREET • CHICAGO, ILLINOIS

SINCE 1888—MAKERS OF ALL TYPES OF GEARS AND GEAR SPEED REDUCERS

since 1931

CUTTING ENGINEERING OVERHEAD....

A major contribution of independent production engineering firms to industry has been the reduction of engineering overhead through elimination of excess staffs to handle seasonal peaks or periodic overloads.

Yet this needed staff remains available on a few hours notice for either a complete engineering program or any part thereof.

With Pioneer as their leader since the 1930's, independent engineering companies have consistently cut overhead as well as manufacturing costs for their customers.

Pioneer
ENGINEERING
& MANUFACTURING CO., INC.

19651 John R St.
Detroit 3, Mich.

three strengths and four widths: 24-, 36-, 48-, and 60-in. sizes. Unit can be attached to almost any trailer hitch; by removing wheels and handle, sweeper can be quickly adapted for use on lift trucks.

Eriez Manufacturing Co, Erie, Pa

Two new series of toggle switches have been introduced with riveted solid silver contacts to prevent loosening and provide maximum conductivity and heat dissipation. Momentary versions are built without return springs. Both series have either maintained or momentary contact position variations.

Minneapolis-Honeywell Regulator Co, Micro Div, Freeport, Ill

Expamet, an expanded aluminum mesh, has been introduced for a variety of uses, including machinery guards, air-filters, electrical screening. Lightweight material is rust-resistant, can be dyed and anodized in a wide range of colors. Twelve standard sizes of mesh are available in flat sheets.

British Industries Corp, 16½ Duane St, New York, NY

Stoody Build-Up is an extruded alloy-coated electrode designed to produce an alloy steel deposit of consistent medium hardness of 29-31R$_c$ under normal conditions. Although not a hard-facing alloy, it has certain limited uses as a final overlay on equipment where impact is the principal wear factor. Deposits are machinable with high speed tools. Recommended as an underbase for such parts as drive sprockets, tool joint shoulders, and clutch jaws.

Stoody Co, Whittier, Calif

Spot-Seal, is a specially coated protective covering for wrapping metal parts; it adheres to itself with simple pressure. Can be used for either manual or mechanical production packaging. Available in rolls, printed or plain, 600 ft long and in widths from 12 to 48 in.

Sherman Paper Products Corp, Newton Upper Falls, Mass

Transvar 266 is a product developed to control the dusting of concrete floors by binding together the dust particles that are actually a part of the surface. The thin liquid may be applied by brush or mop and leaves no surface film.

United Laboratories, Inc, 16801 Euclid Ave, Cleveland, Ohio

since 1931

COMPLETE ENGINEERING RESPONSIBILITY

Pioneer offers industry an industrial engineering service proven capable of handling every detail of the most complete program.

Its customers find that dealing with one group of engineers qualified to handle all phases of industrial engineering reduces cost, saves time, and promotes better coordination.

Pioneer is able to do this because it employs the most qualified of engineering manpower --- capable of supplementing your engineering staff.

Pioneer
ENGINEERING
& MANUFACTURING CO., INC.

19651 John R St.
Detroit 3, Mich.

Two models of the Bete fog nozzle with spiral fog tip have been designed for 1½-in. hose. Turning handle changes nozzle from Off to Fog, then to Straight Stream. G-15 model has a fog capacity of 50 gpm, stream capacity of 100 gpm. G-10 is recommended for inside fire fighting where water damage must be minimized; it has 25-gpm fog capacity, 50-gpm straight stream at 100 psi.

Bete Fog Nozzle, Inc, Greenfield, Mass

Fas-Tin is a solder flux paste which wets through dirt, rust, and grease, and completes tinning action in one operation. Tins copper pipe and oil-impregnated bearings without precleaning, and joins all dissimilar metals except aluminum. Product covers 25 sq ft per lb.

Farrelloy Co, 1217 N 26th St, Philadelphia, Pa

Marking device for screw machines is available which permits die marking on the end face of parts during machine cycle. Model 600-E is said to be suitable for both light and heavy work on automatic and hand-operated screw machines, bench and turret lathes, etc. Marks on any diameter of face of 1½ in. and up.

New Method Steel Stamps, Inc, 147 Jos Campau, Detroit, Mich

Self-sticking Write-On labels combine a printed form and write-on space on the label. In addition to seven stock printed items, Write-Ons may be ordered in any size, wording, or shape. Available mounted on a dispenser card, which acts as a portable writing board.

W H Brady Co, Milwaukee, Wis

Series of all-welded, pressed steel wheels has been added to the Goddeyne line. Manufactured in four sizes, 6, 8, 10, and 12 in., wheel is available with either ball or oilite sleeve bearings, and with semi-pneumatic or solid rubber tires.

Goddeyne Wheel Products, Bay City, Mich

Power-driven winch assembly has been fitted to the Super-Huskie six-wheel gas tractor; capacity of attachment is 15,000 lb. Assembly is located at a low elevation on rear of tractor; driver can operate it without leaving his seat. The 6500-lb tractor develops a 5000-lb effort.

Mercury Manufacturing Co, Chicago, Ill

Are you throwing THOUSANDS OF DOLLARS into the SCRAP BIN?

You can now chrome plate worn gages *IN YOUR OWN SHOP*

This compact new chrome plating unit is saving real money for leading engineering and manufacturing concerns throughout the country. For instance, here's what Taller and Cooper, Inc., foremost makers of toll collection equipment and builders of electro-mechanical measuring and recording devices, say about their Chromaster installation:

"Within one hour from the time a space was arranged for the unit, the Chromaster was in operation. In the very first day over $100.00 worth of undersize plug gages that normally would have been discarded were replated and put back in use in our inspection department."

Same saving applies to other small tools

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Chromaster

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Model A-20 (shown here) is a 20-amp, bench-mounted unit for the gage room or tool crib; plates up to 10 sq. in.

Model A-50, 50-amp, bench-mounted unit for larger shops in plating of cutting tools. Plates up to 25 sq. in.

Model A-250, 250-amp, floor-mounted unit for production plating of small parts in greater quantities or larger parts with areas up to 125 sq. in.

Industrial Chrome Division
Ward Leonard Electric Co.
17 South Street,
Mount Vernon, N. Y.

Please send me complete information on Chromaster industrial chrome plating

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COMPANY .....
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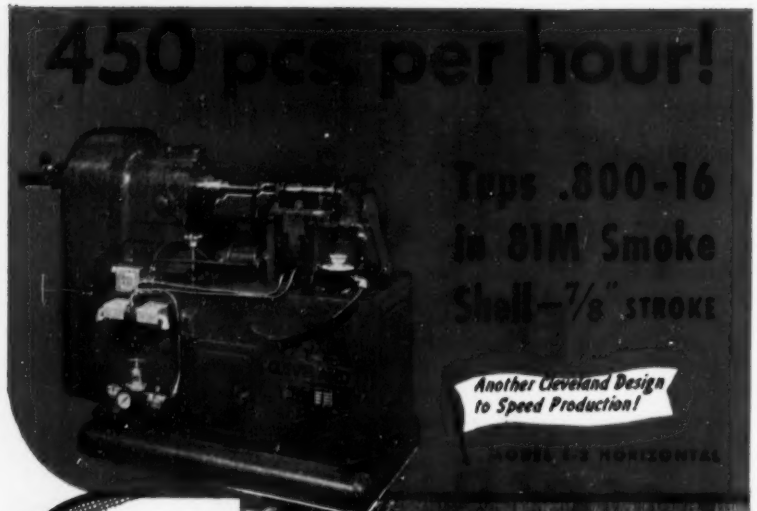
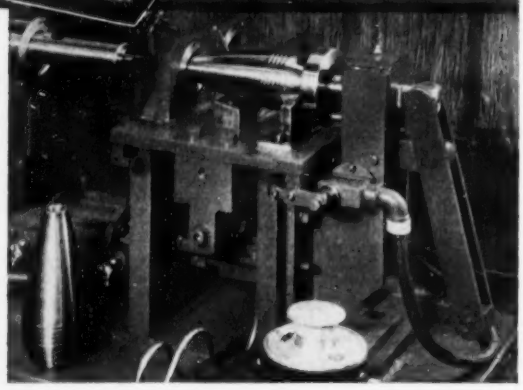
CITY ..... ZONE .... STATE .....





Day after day this Cleveland machine has been turning out an average of 450 pieces per hour! Two cradles operate on a 2 position, air-operated shuttle. Operator loads shell in open cradle and pushes palm start switch. At end of tap cycle in progress the new part is brought into tapping position and the tapped part brought out to one side for unloading.

Cleveland engineers have designed machines to meet the special requirements of scores of plants throughout the country. Because of their know-how—because of the precision tapping achieved at high speeds by Cleveland's famous lead screw feed and because several operations can be combined in one machine—you can be sure of getting more perfect pieces per hour with a Cleveland machine designed for *you*.

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A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC.

CANTON 6, OHIO

ROUND TABLE *Discussion*

WHO RATES THE BOSS?

Is a foreman-rating card, to be filled out by the shop men, a healthy idea for general morale? Would such a policy result in overboard criticism, or might it not bring to light a few weaknesses which the foreman could easily correct?

IF BY THE "BOSS" we mean the shop foreman, then the person responsible for appointing him shop foreman should also be responsible for rating him. Presumably, that person would be the shop manager or the works manager.

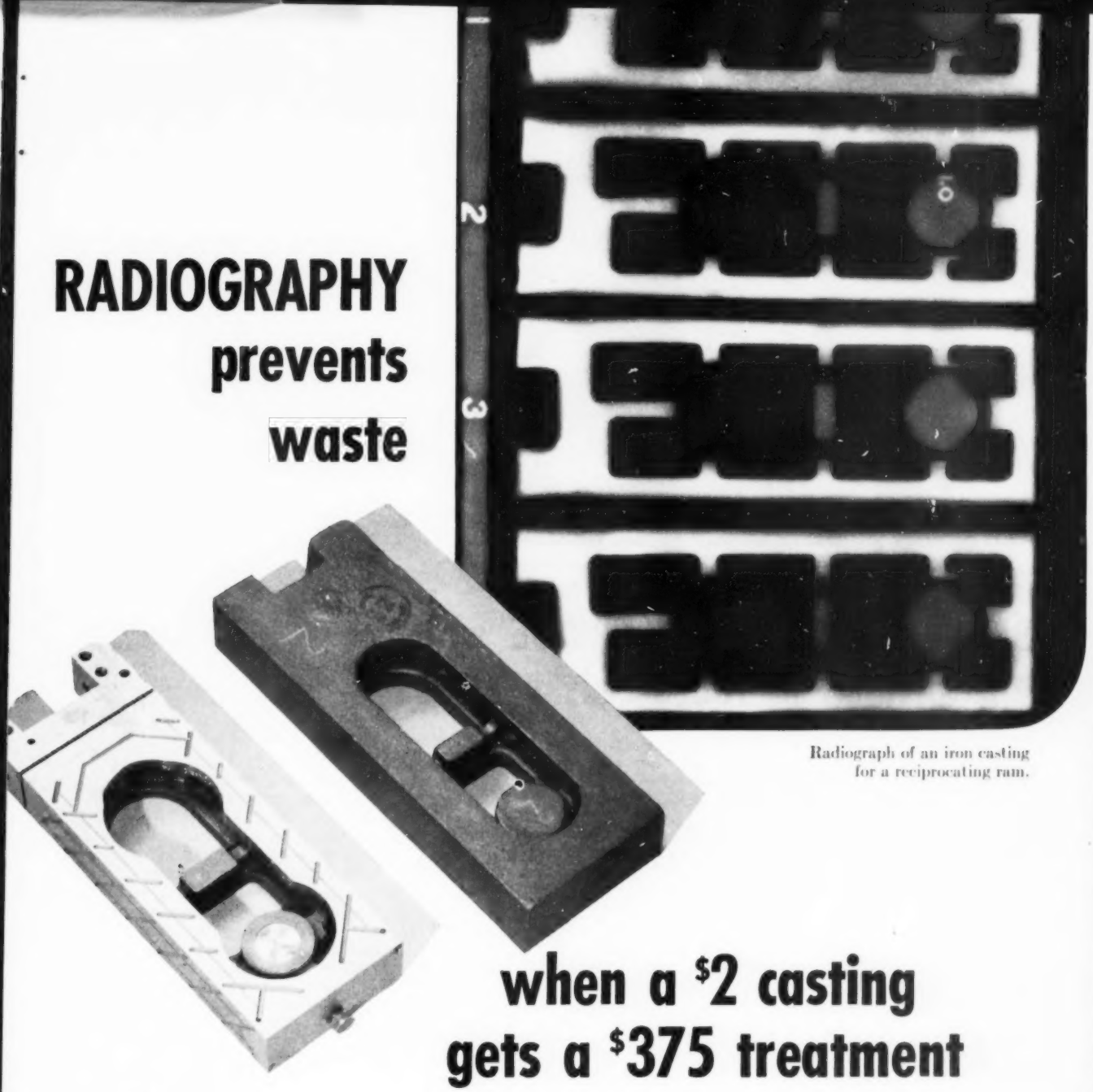
Where a *fareman* must issue foreman rating cards to his men asking them to state their opinions of him, the men could hardly be blamed if they thought he was fishing for compliments. They would not be likely to conclude that the foreman was looking for brick-bats. With some of them, perhaps, privately thinking him an ass, they would naturally feel he did not want to be told that. Grousers excepted, most people like to tell their chiefs what they think those chiefs would like to hear. A high percentage of the rating cards would thus be certain to carry false values and, consequently, would be valueless for the purpose Al has in mind.

If anything useful and reliable is to emerge from the foreman-rating cards, complete secrecy concerning the identity of the raters would have to be observed. Even so, quite a percentage of the rating forms would be fit only for the waste paper basket, since complete secrecy is an excellent opportunity for the joker and the confirmed grouser.

An executive colleague, Black, by name, keen as mustard and a 100% believer in cooperation, issued sheets to the shops asking for suggestions calculated to promote increased production. From about three hundred men consulted, twenty two suggestions were found in the shop suggestions box. Of the twenty two, five, only, carried a signature, two, only, were worthy of further study and no fewer than four, unsigned, briefly and tersely compressed their suggestion for increasing production into two words, "Sack Black." One, also unsigned, read "Can't be done; Black's white."

I cannot imagine any *foreman* asking his men to state on a card their opinion of him. To do so would

RADIOGRAPHY prevents waste



Radiograph of an iron casting for a reciprocating ram.

when a $2 casting gets a $375 treatment

This is a casting for a reciprocating ram. It is to be machined and hand scraped to a final flatness of less than .0001 inch. Should porosity show up during machining, the cost of work done and heat treatment is wasted. The part must be scrapped, not scraped.

But radiography avoids that. By x-raying every casting, flaws are discovered before work is started . . . before hundreds of dollars have been invested in machining and heat-treating costs.

This is another example of the savings possible through radiography.

If you'd like to be sure all your castings are sound—if you'd like to know ways to improve yield in production runs—get in touch with your x-ray dealer. He'll gladly talk it over. Or, if you like, write us for a free copy of "Radiography as a Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, N. Y.

Radiography . . .

another important function of photography

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McCaskey Tool Crib Control, adapted to the unique production needs of U.S. Naval Ordnance Plant, Indianapolis, pays dividends in . . .

BETTER TOOL CRIB SERVICE with BIG SAVINGS in TOOLS and SUPPLIES

The Naval Ordnance Plant, Indianapolis, may be classified as a large jobbing shop developing, fabricating and assembling precision instruments. Approximately 20,000 standard tool items, together with consumable supplies and special tools, are required for normal production needs.

Six McCaskey-controlled floor cribs in addition to a large main tool stores crib provide prompt, economical tool service. They are operated under the supervision of Harold E. Evans, Head of the Tooling Division. He writes that their use of McCaskey Tool Control methods has given them:

. . . improved service at the crib windows;

. . . constant control of all tools;

. . . rapid, accurate clearance of terminating employees' tool charges;

. . . a 40% saving in procurement of standard tools and consumable supplies in first year's operation;

. . . monthly report of the cost of worn and damaged tools and miscellaneous consumable materials chargeable to each unit that is effective in holding them at a minimum;

. . . usage factor on all tool items that provides basis for reducing crib inventories;

. . . Broken or Lost Tool Report procedure that has reduced misplacement and loss of tools and makes available valuable data on reasons for breakage and for inventory and cost records.

Large or small one crib or a dozen similar results from improved tool crib control methods can be yours, too. Investigate NOW! Mail coupon for step-by-step procedure and detailed reports from representative users.

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merely be an admission, on the foreman's part, that he did not know his men and that he was, therefore, not the complete foreman. Any keen, alert, observant shop foreman who has handled a given squad for a reasonable length of time should know the men like the back of his hand and, knowing them, should have a fairly accurate picture in his mind of what they think of him. For a variety of reasons, it could easily be a more truthful picture than, perhaps, 40% of any rating card replies.

Should the men be asked, formally, to rate their bosses? If it is suggested that the higher executives invite the workmen to rate their foremen, I don't think they should. Most of the men do indulge privately in that very human exercise without being invited to. A foreman is an executive officer of the company, and as such he enjoys, or should enjoy, the confidence and support of the higher executive officers.

For the highly placed officers to invite or even encourage the men to express their opinions of their foremen, would be in the worst possible taste and would probably have the effect of raising doubts in the men's minds concerning the higher executives' own opinion of the foremen. That would be an intolerable situation and one in which no capable, self-respecting foreman should ever be placed, or could possibly be expected to accept.

If this idea is seriously suggested as a means of keeping a manager informed as to the qualities of his foreman, it becomes even less attractive. It is part, and an important part, of a manager's job that he should satisfy himself on the soundness of his foremen's conduct and judgment, but not in that way. He

"You're right! I wanted a soft hammer for this job, but not this soft!"

UNPARALLELED GRIP *from parallel jaws*

Latest And Greatest In Collet Design! Tool engineers and machine tool builders praise the Jacobs Rubber-Flex Collet as one of the outstanding developments in modern tool history. This new principle of collet construction brings you not only great improvements in gripping power, accuracy, and service life, but — *for the first time* — a collet with a full ⅛ inch capacity range.

The Jacobs Manufacturing Company, West Hartford 10, Conn.

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THE S-P MFG. CORP.
ESTABLISHED 1916
12415 EUCLID AVENUE
CLEVELAND 6, OHIO
A Bassett Company

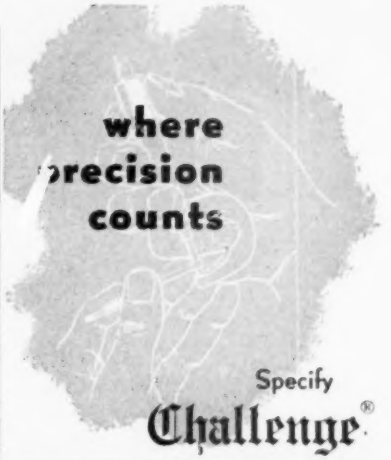
should not be an unwilling or willing listener to, or encourager of other opinions, for or against; he should form his own opinion by personal observation and daily contact.

This, of course, is not to suggest that the manager should refuse to examine a complaint concerning a foreman, from the shops or elsewhere, but that is far removed from inviting or encouraging the men to freely express their oponions of their foremen. If a foreman is a fair dealer and above-board, he can afford to be a driver and the majority of his men will be loyal to him. They will even mildly resent any attempt on the part of a manager to snoop or quiz, concerning their feelings towards their foreman.

I recall a lady—perhaps "woman secretary" would fit better here—who displayed an unusual interest in the men's opinion of their foreman. She and her chief, the works manager, seemed to be on the friendliest of terms and it was generally believed that she had high hopes of one day putting an end to his bachelor state. Among the men she was known as "Clematis," and was the subject of a multi-verse, ribald rhyme entitled "She Snoops To Conquer."

By and large, the men regard the foreman as one of themselves and don't look with favor on the higher-up who gives the impression of being willing to listen to tales out of school. Of course, in all shops there are those who would jump at the chance of discussing the foreman with the manager, just as they would be deliriously happy, discussing the manager with a director, but they are a small and small-minded minority who ask for nothing better than to fish in troubled waters.

"If you had to snitch a piece—why did it have to be 'Taxes'?"



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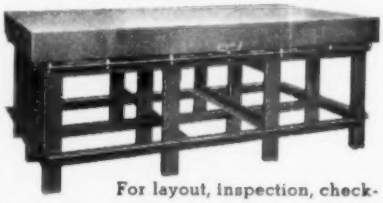
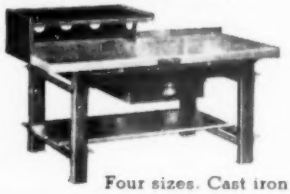


For layout, inspection, checking, lapping, assembly and welding operations . . . depend on the accuracy and stability of Challenge Precision Equipment. Mail coupon for information on Layout Surface Plates . . . Clamp Edge Layout Plates . . . Reading Tables . . . Lapping Plates . . . Welding Tables . . . Surface Plates . . . Bench Plates . . . Surface Plate Equipment.

Challenge Work Benches . . .



Four sizes. Cast iron top, two inches thick. Welded steel supports, tool box shelf, steel drawer with lock. *Challenge Utility Benches* — low cost. Standard height or 30" as nailing table.

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Here is a worm gear drive which safely and surely protects against overload damage to conveyor assemblies and other industrial machinery yet operates without the use of shear pins or electrical overload relays. The *Torque Control* unit may be set for almost any predetermined torque — when this loading is exceeded the driving motor is instantaneously stopped, thus protecting the entire train of equipment.

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The *Torque Control* unit was initially developed for the conveyor industry—its highly successful use in this field has led to its application on a wide range of industrial machinery where instant protection against overload or jamming is necessary.

Torque Control may be incorporated on any of the standard line of Philadelphia Worm Gear Speed Reducers in horsepower ratings up to 260 HP and ratios to 6300:1.

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Li'L CHAMP SAYS...
INSURE SAFE DEPOSITS— BANK ON CHAMPION WELDING ELECTRODES"
BOY, IT'S JUST LIKE PUTTING MONEY IN THE BANK USING CHAMPION ELECTRODES! SOUND, SAFE DEPOSITS MORE WELD FOOTAGE !!!
BROTHER, I AGREE... THERE'S NOTHING LIKE 'EM FOR FAST WORK!
FOR TOP QUALITY WELDS CHAMPION ELECTRODES DELIVER THAT EXTRA FACTOR OF SAFETY! THERE IS A DEPENDABLE CHAMPION ELECTRODE FOR ANY WELDING APPLICATION.
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THE CINCINNATI GEAR COMPANY
"Gears . . . Good Gears Only"
Wooster Pike and Mariemont Ave. • Cincinnati 27, Ohio

Would some consider it squealing to rate the foreman? The best elements in any shop I've known, would. I remember once twitting a steady-going old-timer about his evident reluctance to express his honest opinion of what I regarded as the illicit activities of a particularly busy and obnoxious shop steward who had succeeded, temporarily, in setting the shop by the ears. The reply I got was a somewhat dry "I've often been sorry for speaking, I've never been sorry for holding my tongue." That attitude had its origin in his sense of loyalty to one of his own class, however misguided. But despite his non-committal reply, I have reason to know that he was chiefly instrumental in convincing the younger, somewhat reckless shop steward of the error of his ways and of restoring peace and harmony to the shops, without the intervention of either foremen or manager.

That is typical; to have discussed the shop steward with me would, to him, have seemed like squealing, and he preferred to have it out with one of his peers rather than express his views to one who "did not belong." Such an attitude has much to recommend it and so long as the majority of the men hold these views, the habitual trouble-makers are not likely to make much headway.

Would such appraisals be honest—or a chance for gripes or favor-currying? Such appraisails would only be honest, were honest men persuaded to make them, but the difficulty would probably be to get the honest-to-goodness men to voice their opinions of their foremen. If their opinions were favorable to the boss, the right type would, in all probability, think twice before expressing them to a higher-up in case they might be suspected of currying favor at top level. If any of the men

"Well, lah de dah! Does your wife know you're wearing a tie at work?"

did respond to the embarrassing invitation they would probably loose caste with the better elements in the shops.

Generally speaking, to my mind, the whole idea of inviting the men to express their opinion of the boss is contrary to a democratic conception of fair dealing. It is beneath the dignity of free men and savors too much of a dictation which is not benevolent. It is morally wrong, and therefore cannot be industrially or executively right. It is a mild form of spying, and while I have sometimes had cause to be disappointed in the men, I refuse to believe that the best elements would approve of it. The other small minority need not be considered at length. There is little doubt where they stand in the matter, and since their opinions could not be regarded as reliable, there would be no point in considering them.

M Donald
Lanarkshire, Scotland

•

PIGS IS PIGS

How much responsibility has a machinist for keeping his work area in reasonably clean condition? Is this completely the sweeper's job, or will an able worker naturally tend to keep his territory orderly?

YES, MR EDITOR, "pigs is pigs." And don't they just love to wallow in the mire, and try to induce others to wallow with them?

Of course it may be that Al thinks, if his foggy brain is capable of such a function, that to save sweeper's wages is an economy. No charge for sweeping expenses would appear in the books; superficially, but only superficially, this could be correct. It could be equally true, however, that if the company bought neither power, coal nor material, and provided neither machines nor plant, the wages of machinists, as well as of sweepers would be saved. But any one of these omissions would affect production.

Capital must be either profitably used, consumed, or lost, and to use production wages on unproductive work is one slow but sure way of losing it. This is what happens when machinists are used to sweep floors —costly sweeping with waste of production time. The man from Kansas City was right and, although Al thought otherwise, he was really a friend in disguise.

There is a more important side to the question than that of wasting

Day and night—wherever your steel is stored or handled —RUST, the biggest thief in America is robbing you of production, robbing you of profit.

Oakite can help you defeat rust three ways:

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OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

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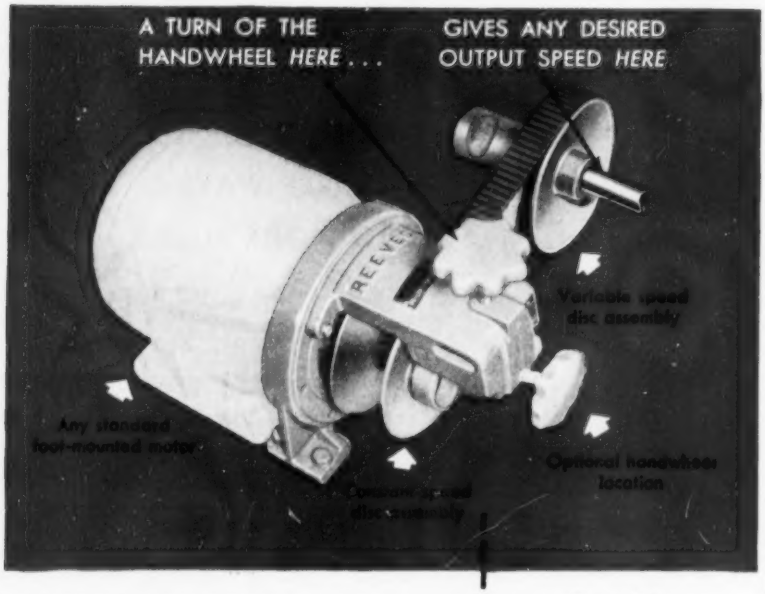
Mounts in any position . . . drives in any direction . . . gives any speed within 8:1 range. *Low Price!*


A TURN OF THE HANDWHEEL HERE . . .
GIVES ANY DESIRED OUTPUT SPEED HERE
Variable speed disc assembly
Any standard foot-mounted motor
Optional handwheel location
Constant-speed disc assembly

New REEVES Flexi-Speed Drive is the most versatile variable speed drive on the market today. Drives in any direction. Mounts in any position—above, below or beside the driven machine—practically without limitation. Speed control handwheel and driven shaft may be located anywhere around the motor shaft. Six different length belts offer a wide choice of shaft center distances.

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REEVES Flexi-Speed Drive is ideal for driving to standard gear reducers for parallel drive, on worm gear reducer for inexpensive right angle drive. Its versatility assures maximum production with the greatest efficiency and economy in your machines. Write today for complete details. Specify Dept. A902-V532

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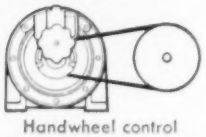
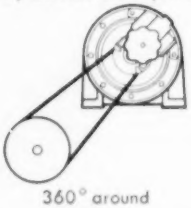
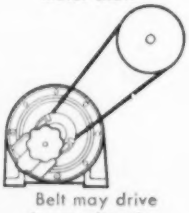
Some of the mounting positions



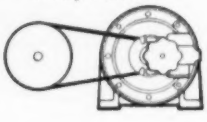
Handwheel control may be located anywhere



360° around motor shaft—



Belt may drive in any direction



REEVES SPEED CONTROL

machinists' time. Pigs are pigs, but machinists are not pigs. They are an intelligent crowd, and will not associate with pigs. A foreman of Al's kind must be content with men of the sloppy, untidy, careless type, whose work will probably reflect these characteristics.

Can any firm afford to save sweeper's wages at such a cost? Can they afford an Al, or whoever is responsible for such folly?

There is an old saying, "birds of a feather flock together;" should one rather not say, avoid slandering clean, tidy birds—pigs of all kinds grunt and wallow together—but only pigs.

P E James
Lincoln, England

•

CAN A MAN STEP DOWN?

Is it a reflection on the foreman when a man he has picked for his assistant must be demoted? Will he be blamed for his initial poor judgment? Will the worker be more likely to resent the demotion, or realize that he was not yet quite ready for the job? Reader's opinions vary . . .

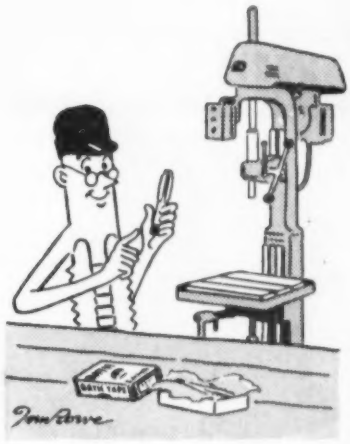
CAN A MAN step down? Sure he can, but I've seldom known a man do it gracefully if compelled to step down.

I have known a few who did it gracefully of their own accord—tired of responsibility, in failing health, and one elderly foreman, because he had become fascinated with an absorbing hobby which, he said, demanded all his powers of concentration. I have yet to meet the man who gracefully accepted a compulsory step down, even for such an obvious and compelling reason as shortage of work or lack of raw materials. The latter cause drew from a demoted assistant recently, the sardonic comment, "Raw deal!"

Within the last year I have had the distasteful task of causing the demotion of a man for whose promotion, two years ago, I was likewise responsible. With this unpleasant problem on my hands, my thoughts turned in the same direction as Al's—what would the Chief think? Would he feel I was a poor psychologist, or would he suspect me of having ulterior motives? After much careful thought I decided that, come what may, I would clean up the mess. When I had caused the man to be promoted, I had known him casually through occasional meetings at plant social functions. He was in his thirties, very much alive, agreeable and well-spoken. Before suggesting his advancement, I

TAP-ODDITIES

On a windy day, Production Pete
Is always making "checks" —
On the contour of a pair of shanks
Without the aid of "specs".



And when it comes to a production run
Where "specs" must play no pranks.
Pete picks Bath Taps for contour —
Admires their perfect shanks.

The manufacture of Bath "ground from the solid" Taps, has been perfected to take advantage of the latest technical methods, equipment and quality control — producing working tools of uniform structure and in perfect concentricity for precision threading. This means everything must be in line — even to the shank.

Flute contour is important, too. At the Bath plant, flutes are ground on centers in perfect alignment — and, after polishing, assure a refined cutting edge — all the way to the crests of the teeth. Getting full cutting benefit means better threads — especially when you know everything is centered with the axis of the tap.

For "true" value — "in line" with long wear — insist on BATH TAPS for BETTER THREADS.

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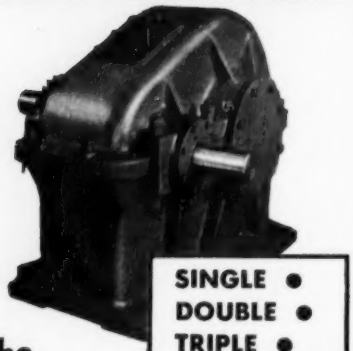

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had of course assured myself by inquiry as to his capabilities, and for a matter of eighteen months he did commendable work as an assembly charge hand. A night-shift foremanship became vacant and I caused our friend to be stepped up. That started the trouble; evidently, he could not "stand corn."

In due season, complaints came in from the day foreman concerning hoity-toity notes left by his night-shift opposite number, criticizing his part of the work and instructing him as to the future handling of certain jobs. There were also rumors regarding lack of supervision at night and difficulty in arriving at decisions. I decided to investigate in person and, on my first visit about two o'clock in the morning, I found four machinists waiting information about their work, the while their foreman refreshed himself, in his office, with food, washed down with bottled beer. The transition from night-shift foreman to day-shift operator was swift, but his foreman reports that after almost a year on good piecework, the demoted one is still difficult and surly. The quality and quantity of his work is quite satisfactory and, short of impertinence, his foreman is prepared to ignore his lack of manners.

I don't think Al should worry too much about the Chief's opinion of his ability to pick winners every time. Selecting a foreman from the tools with no executive record behind him, must always be something of a speculation. Even otherwise sane, reliable men have been known to lose their head when placed in a position of authority; this can only be discovered by trial.

What happens when a man is demoted? Different things happen with different men. If the down-

"I don't care what the salary is as long as the foreman is single!"

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ward move is dictated by circumstances outside the control of the management and the man, the man may settle down, given time, to show by his industry, skill and conduct that he still is worthy of a better job and hopeful of getting one within the company, when a suitable vacancy arises.

In my experience, that is the usual pattern if the man is straight and competent, and is satisfied that his demotion was unavoidable in the circumstances. If the demoted man is unscrupulously ambitious, almost anything can happen, since that kind will stop at nothing to gain his ends, and if he happens to have any influence with the men in the shops, anything from go slow to a strike can happen.

In the vast majority of demotion cases, the first reaction of the man concerned is one of disappointment and resentment—this is quite natural. It is extraordinarily difficult to convince a man that he has proved to be unsuitable, even when that fact is apparent to almost everyone else. The pugnacious type generally become hostile and surly and either looks round for a new billet or remains surly and unhelpful to his foreman who usually is in no way responsible for his demotion.

What happens when you know a man is undercutting you? Much depends on what kind of person the man is who is being undercut. If the man is timorous or unsure of himself, the man who is bent on undercutting him will grow bolder and bolder each time he scores, and if not promptly put in his place will become a permanent thorn in the foreman's flesh. More and more he will seek to usurp his foreman's authority and will probably create much annoyance and disappointment in the shop. He, the usurper, is almost certain to favor the gossipmongers who are to be found on all plants, and then to make the utmost use of them in discrediting the Chief, back stage. Weak, spineless creatures who prefer to hear ill of others, rather than good, are willing tools who are prepared to circulate rumors and hints, even when they suspect them of being untrue. The undercutter also makes excellent use of the weakling type who feels flattered when consulted or taken notice of by stronger personalities than himself, scrupulous or otherwise. On occasion, he will dress up his slander in humorous trappings and this is really about the most deadly and deceitful approach of all, since it carries with it the hypocritical suggestion that the Chief is,

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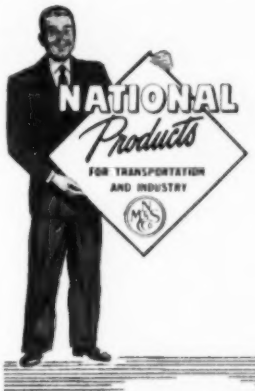

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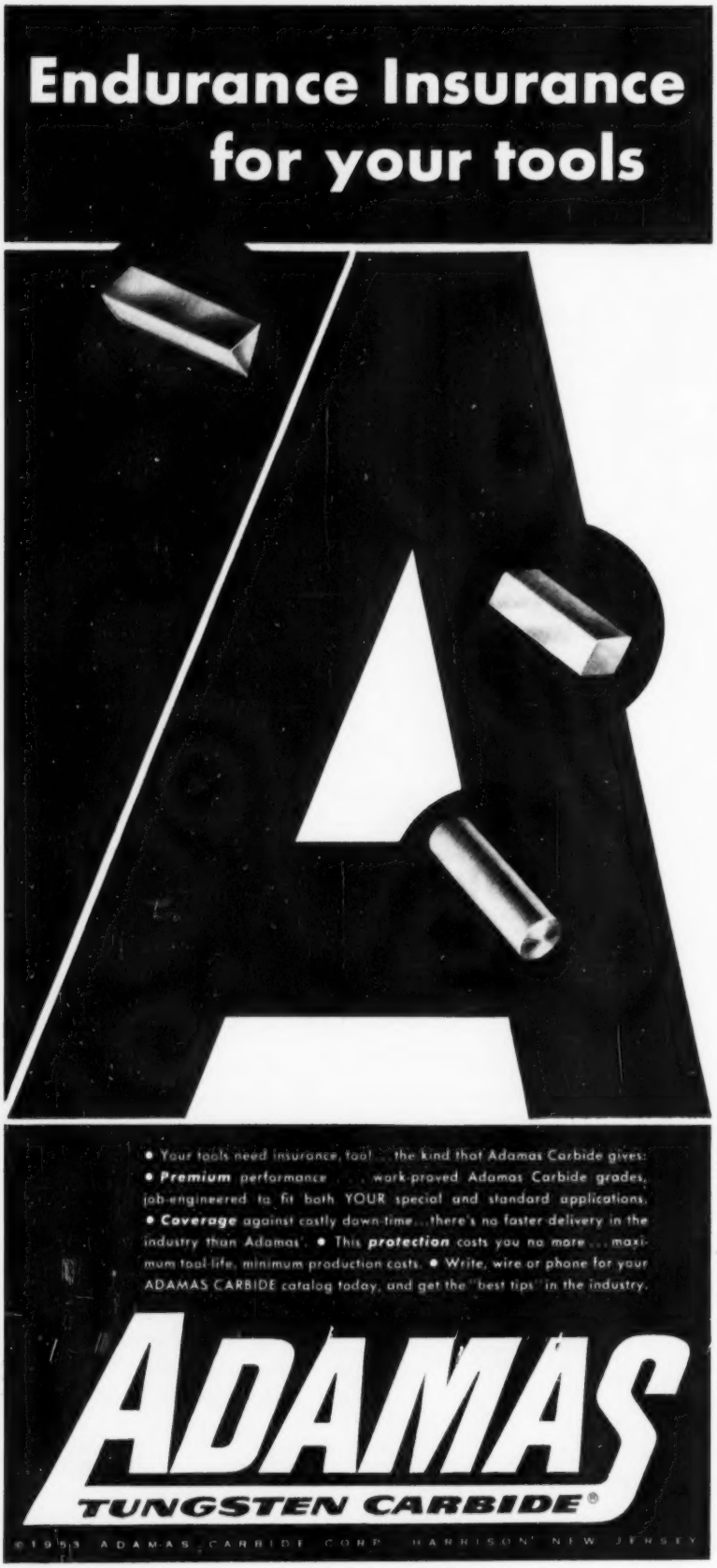
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in reality, a good sort but perhaps not so alive and wide-awake as he should be to hold down such a responsible job. The undercutter, in this guise, generally contrives to convey the impression that there is nothing he would not do for the old man and probably drops vague hints of the number of times he has "saved his bacon" on the quiet, just because he is such a likeable old duffer.

In this case of the undesirable type like Bingham who attempts to undermine the foreman's authority and position, there is only one solution. Demotion should be succeeded by dismissal at the earliest favorable moment; until then he should be kept on a tight rein. For the good type, willing to fit in and make the best of, to him, a bad job, every consideration should be shown. Early opportunity should be taken to improve his position and prospects as and when opportunity arises.

There is no standard method for solving this problem, since the individual sets the problem and, as no two individuals are exactly alike, so no two examples of this particular problem can be exactly alike. Each example must be examined on its merits and an appropriate solution sought. There are, however, two broad solutions which appeal as rough guide. For the pugnacious, surly, sulky type, a soldier' farewell; for the reasonable, understanding, cooperative type, the helping hand.

M Donald
Lanarkshire, Scotland

•

PRIVACY, PLEASE

Does working in partitioned enclosures tend to increase efficiency? Will the men resent being stalled off and separated from their fellow-workers? How does semi-privacy affect concentration—favorably or unfavorably?

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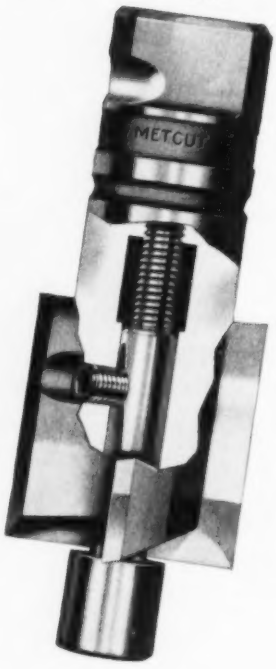

METAL CUTTING TOOLS, INC.
ROCKFORD, ILLINOIS

concludes that the outstanding feature of the American character is its hatred of solitude. Whilst residing in the USA, the writer often wondered why doors were ever fitted to the cubicles in the men's room. They were always wide open when occupied.

The wide-open working area, unbroken by partitions, cubicles and private offices is, by far, the most efficient from any viewpoint. There is no heating problem—heated air can be arranged simply to blanket the whole area uniformly, whereas the division of the workshop into small units makes it impossible to insure an even temperature, with the result that pockets of extreme heat and cold are caused by the break up of the air flow.

Lighting is unduly complicated by the partitioned working area. Each little section must be regarded as a separate lighting problem and special provision must be made to insure that illumination is adequate therein. The capital outlay on lighting fittings is enlarged considerably and the increased number of lighting units required results in additional heavy maintenance on the electrical side.

A further problem presented by the divided working area is the impedence of the free flow of working materials and the hampering of internal transport. Every division or cubicle presents an obstruction to the movement of vehicles and materials. Another trouble associated with the divided floor space is the inflexibility of the shop layout. Unless offices or cubicles are made movable, revision of shop layouts, in the interests of obtaining greater productive efficiency, are almost impossible to carry out.

"Get a load of my convertible."

The psychology and efficiency of the workman are affected strongly by the size of the space in which he works. If working enclosures are small, the smothering effect causes an acute state of claustrophobia in some individuals, resulting in irritation, bad temper and an inability to concentrate. The sufferer is constantly aware of his discomfort and seeks relief by deserting his work place on every possible occasion. Thus, he wastes a lot of time seeking relief and works at a low efficiency when he is actually performing his set task.

The harmful effect of the closed working area on the eyesight of the worker is strong. Continual viewing of work at short range leads to a condition of near-sightedness which is due entirely to the inability of the worker to raise his eyes occasionally and let them focus on objects which are a long distance away. Many firms who believe in the large and unobstructed working area do not permit tool boxes and the like to be piled in benches higher than about 4 ft 6 in. from the floor; this practice insures that the standing worker can exercise the focusing gear of his eyes and maintain them in a healthy condition.

Apart from the worker's physical health being impaired by working in a confined or walled-off area, the temptations to loaf and dodge work when placed in these favorable conditions must not be ignored. The work of supervision is increased enormously if the patrolling supervisor must open and shut doors in order to see what is going on, or if he has to walk directly to the entrance of a cubicle. The open working area enables a lot of territory to be studied by the executive when standing in one spot. The visible presence of the supervisor deters the worker from any temptation to

"—Let that be a lesson to all your time-study men!"

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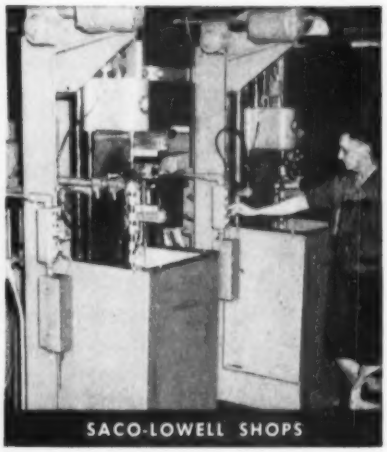
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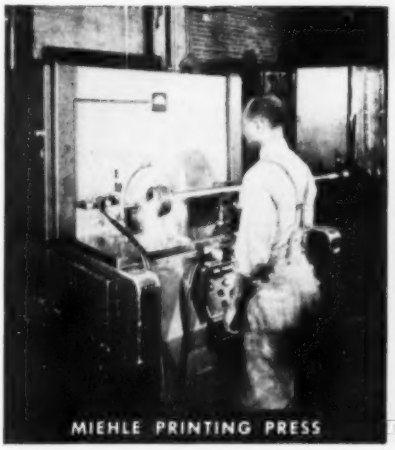
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absent himself unreasonably from his job.

The private office for workers of minor importance is a menace to efficiency. The writer knows of one large organization which provided private offices for minor executives. One aspect of the duties of this type of executive was attendance at conferences and the only indication that the executive had turned up for work at all was his hat and coat hanging in the office. One unscrupulous type managed to spend a mere two hours a day, for several months in his office, spending the rest of his time out of the building on his own personal diversions. The carefully placed hat and coat was varied according to the state of the weather and served as a false indication that the executive was somewhere in the building. When the executive was finally found out, he confessed that when he had worked in an open office with several other persons in the same room he was unable to do any "dodging" but the promotion to a private office had proved too high a temptation.

The above example is a rather extreme case, but similar situations have arisen when jig-boring machines have been enclosed in air-conditioned chambers. The operators have been known to absent themselves from their machines for an hour at a time, leaving the machine motors running as an indication to anyone that they would be returning in a minute or two. In the case of air-conditioned work places like jig-boring and inspection departments, it is advisable to wall them in with double glass. It is better for both the operators and for the firm as a whole.

From whichever aspect you look at it, the number of private sanctums and cubicles must be reduced to the absolute minimum in any manufacturing organization. Foremen and

"Oh, Miss Dackson, remind me to have a rumor started next week about laying off men . . . production has dropped off lately."

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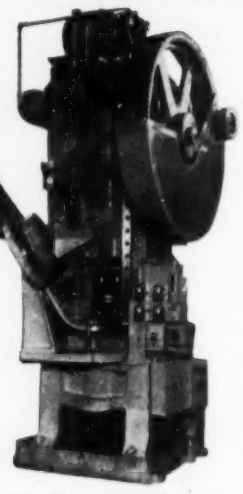

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THE RUTHMAN MACHINERY CO.

1818 Reading Road, Cincinnati, Ohio

executives should have a small private room available for their use when they wish to discuss shop matters under tranquil conditions with other executives and workmen, but they should not be encouraged to hole-up in these private sanctums.

One firm overcomes this difficulty by providing one small office only on the shop floor. It is no particular person's private working place, but is put there for general executive use. The foreman can talk in private to workers or others, the employment and welfare men can have interviews there, salesmen can be interviewed and telephone calls made. The foreman's "office" is a desk and some other equipment located out on the shop floor with a white border painted around it on the concrete to denote its boundaries. This puts the foreman where he belongs—at the heart of operations—and enables him to do his work with a minimum of running around. He can view the limits of his own department if he stands up and can see every workman and what he is doing at a glance.

Clifford T Bower
London, England

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SHOP WORN

What is the best way of handling the case of a shop foreman who appears to have outlived his usefulness? Is the company to blame for not providing him with sufficient opportunities to keep abreast of new developments as they come along? Should the man be offered a lesser job, and kept on for the benefit of his years of experience?

IN THE CASE of the executive who has not kept pace with the technical progress of his firm's work and methods there is no doubt that he will have to be moved. He can sabotage all attempts to obtain higher productivity from a plant, with his backward ideas. It is useless to try and teach an old dog new tricks; better that he be shifted to some other duty where any talent that he does possess can be put to good use.

Choosing the foreman as an example for the case study presented is not a very apt thought, because the modern trend is to lift the responsibility for technicalities from his shoulders and to expect him to attend to a multitude of small administrative details. To my mind, this is the right course to adopt because, assuming that age begets wisdom, the older the foreman, the more experience he will have obtained in dealing

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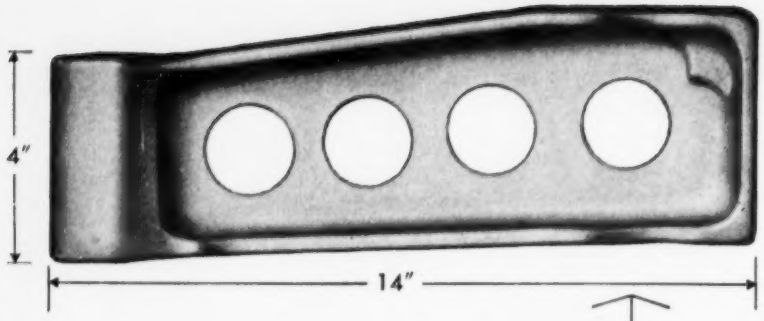

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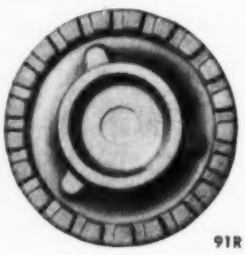

MUELLER BRASS CO.
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91R

with his fellowmen. With the emphasis laid on leadership and the ability to handle men, there is precious little need to worry if the foreman is technically backward. In any firm of a decent size, it should not be necessary for foremen to have any say in the methods used to make the product; all this should be handled by properly conducted planning departments and methods engineers.

The function of the foreman, as I see it, is to take orders from the planning department and to pass these along to his gang of workmen. At the same time, he has to cope with the problems of absentees, bad timekeeping, granting of time off for births, marriages, and deaths, and a host of other petty problems. The foreman is also the liaison officer between management and shop floor and, as such, his duties are largely administrative rather than technical.

Where executives are required to keep abreast of modern methods and techniques and one of them is lagging behind, it is a sticky situation, particularly if the offender is stubborn, unreceptive to reasoning, or refuses to recognize his faults.

There is usually a very good reason for a man lagging behind, technically, and one of the most common that I have experienced is that of divided interests. Some men can become so passionately seduced by an interest outside their work that they think of nothing else, with the result that they can spare no time for thinking about their jobs or learning anything new about them.

It is up to the boss to find out what is the interest that is diverting his executive's energies, and see if some sort of compromise arrangement can be reached. One example that comes to mind is the case of the keen photographer. This man was so mad on taking photographs that he carried a camera on every possible occasion. Instead of reading engineering literature, he soaked himself in photographic material to such an extent that his technical work was becoming a side line.

Realizing the divided interest of his employee, the boss tackled the problem in a realistic manner and told the executive that another man had been appointed to his job. However, all was not lost, so far as the offending executive was concerned. The boss had been toying with the idea that photography could be used in the plant as a production tool, and outlined his scheme to the photographer who, in reply, proceeded to give the boss a half-hour lecture on the various ways in which photography could be used with profit to

the plant. The result was that a photographic department was started and everyone was happy.

This particularly happy solution to a sticky situation can be reached in other circumstances. The old foreman, for instance, could probably make a very good instructor in the apprentice school; in apprentice training it is basic techniques that count—the modern stuff will come naturally to the young.

When a backward executive will not listen to reasonable argument and prefers to shake the dust of the plant from his shoes rather than take on some other job, then the only solution is to let him go, since it is obvious that his whole heart is not in the job—there must be some conflict somewhere in his make-up.

It is almost impossible for a man not to keep in step with the technical progress of his firm unless he erects a mental barrier of some kind against absorption of the new knowledge. Where such exists, it is better that man and job should part.

Clifford T Bower
London, England

•

NOT-SO-SWEET CHARITY

How should fund raising be handled in the shop? Should each individual be assessed a specific amount, or is it fairer to leave it up to the man as to how much he should or can contribute? Who should be responsible for quotas or collections?

THIS MODERN CONCEPTION of public charity collections on a mass scale has certainly made great strides in this, the twentieth century. As a matter of fact, a large percentage of it is a racket. One would think that with a paternalistic government such as we've had for the last twenty years, there would be nothing left for outsiders to do—that the government would take care of everything. But not so. Every year finds more and more causes, hospitals, doctors seeking an easy research graft, and other organizations that want a ride on the gravy train. Whatever they get, they want more, and more—and more—and we give it.

Some of us have lived long enough to view the whole thing dispassionately. Thirty years ago, every Saturday in the cities was a tag day. We got tired of that and didn't want to see those days again. So we organized the community-chest idea. Immediately the number of outstretched hands doubled. Today, the number of good people making profitable and lifetime careers out of

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MODEL G
AIR-O-LIMIT COMPARATOR
Outstanding Features:

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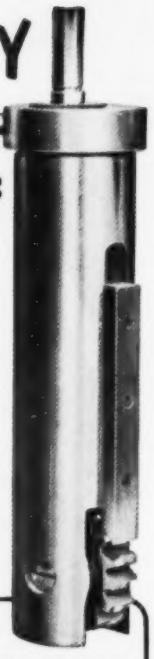
MACHINE TOOLS • CUTTING TOOLS • GAGES

The INSIDE STORY about NATIONAL Keyseating Millers



NATIONAL Keyseating Millers are designed for milling internal keyseats . . . in one cut . . . in offset holes . . . with parallel sides . . . partly through holes . . . of standard width and depth . . . in holes that are closed at one end . . . and many other operations that a keyseating machine can't reach. A demountable guide on body of Miller enters keyseat being milled assuring straight keyseat in perfect alignment with the axis of the bore, thus making it unnecessary to clamp work to drill press table.

CUTTERS are made from high speed Rockwell hardened steel, accurately ground to size. Tops of teeth are staggered to break chips which reduces strain and wear on both cutter and driving pins. It will pay you to put National Keyseating Millers on the inside of your next keyseating job.

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CINCINNATI 22, OHIO

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complete, handy size

For Dependable Accuracy!
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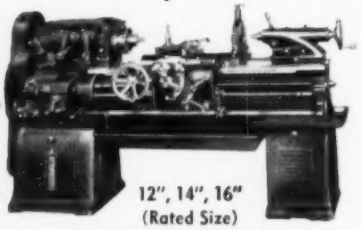

12", 14", 16"
(Rated Size)
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BRADFORD Metalmaster Geared Head Lathes have earned an enviable reputation throughout the years for high efficiency and dependable accuracy. But today's new Metalmaster is even finer! Built to the most exacting standards of workmanship, and of the finest materials and components, these new Metalmaster Lathes are equipped with many outstanding features.

POWER for Your Job: 2 HP to 10 HP
SPEEDS for Your Job: 16 RPM min. to 1000 RPM max.
FEED: 72—.00072 to .1780
THREAD RANGE: 1½ to 368, including 11½ and 27 without extra gearing

• *Let our Engineers solve your lathe problems.*
Write for Bulletin 179
THE BRADFORD MACHINE TOOL CO.
664 Evans St., Cincinnati, Ohio
Precision Since 1840

DELIVERIES:
30 days, subject to prior sale

public charity passeth all understanding.

It is estimated that 32 cents of every charity dollar collected passes into the hands of the medical profession through the front door of children's hospitals and sacrosanct funds earmarked research. It is also estimated that at times as much as sixteen cents of every dollar finally reaches a needy person, after social workers, overhead, the major brass, and pure operational expenses are met.

Twenty-five years ago, Cleveland's Community Chest shelled out to 156 worthy causes. Akron staggered along with only 128. Today it takes over 100 societies to service Detroit. Every one of these organizations surrounds some juicy, well-paid jobs whose holders have their palms outstretched to government, to state to county, to the public—to whomever will contribute. Some of the causes are good, and some—not so.

Having had a hand in collecting this dough for all and sundry for 30 years, I feel qualified to look any of them in the face and speak freely. I would say definitely the very best method of raising community-chest money is the one that was in effect in Akron. Ohio, 25 years ago.

At that time, I was managing a plant for one of the large rubber companies. The Community Chest committee got together and decided how big a melon was to be cut. Then they apportioned a prorata share out to the various plants. I believe our little bit was about $75,000. Our own officers got their heads together and relocated that responsibility to us. It generally worked out to something like five or six dollars per year. And, for my money that was a reasonable figure. We were all called in and told:

"You have five days to do this. We want a minimum of five dollars per man. They can give as much more as they please, but no less. We want that five bucks; it's a must. Now go and get it!"

clear call for

Titan brass

If, like Tar Baby, the metalworking industry sat still and said nothing, little could be learned of its original-metal needs and demands. Scant progress in original-metal production would be the result.

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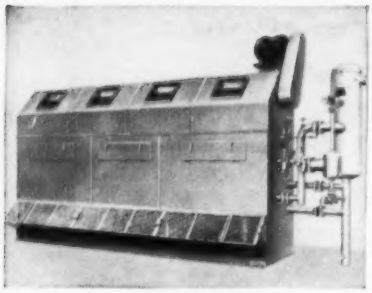

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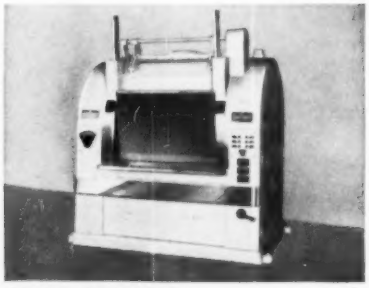

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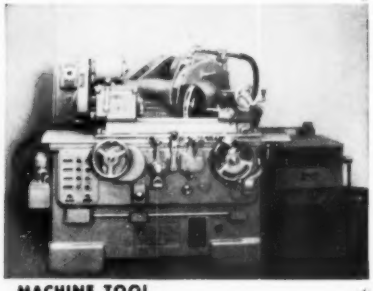

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These are just a few who do!

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WIEDEMANN MACHINE COMPANY

4272 Wissahickon Avenue, Philadelphia 32, Pa.

"And suppose they won't give?

"They will! Get it—or else."

Year after year I got that 100% amount, too. First, I'd send the foremen out to do the spade work. Usually I had about fifteen recalcitrant brothers. This list would shrink very rapidly to about three after I turned on the heat. And year after year I'd finish with one holdout—always the same one. He was a tough boy. He always had the same story.

"I don't mind giving, but I hate to be forced into it."

"Listen, Joe," I'd tell him, "we were over all that last year. You and I had a chance to give, but we didn't. Now, society says we have to give. Me, I like it here, and I string along with society. You better string with me."

"I can't see any of my dough going to Ding's Hospital to make rich doctors richer."

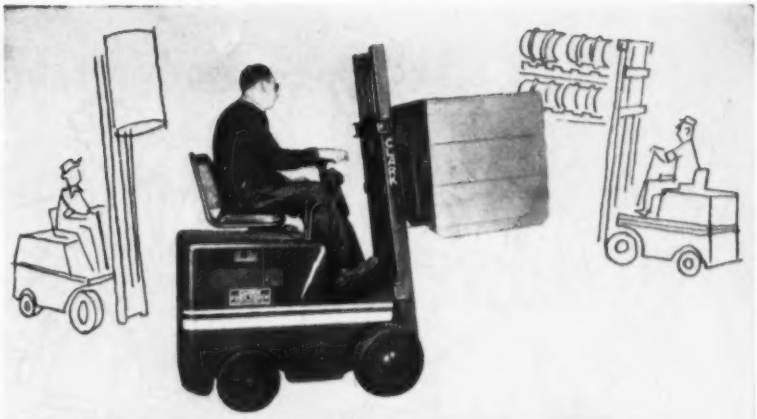
"Then give me a check for the Salvation Army. I never heard anyone say anything about them. They're surely all right."

But every year I'd have to dish out the clincher. "Look Joe, this is orders from the great white father himself —'Get it— or else!' So now I've got to tell you, if you're so unhappy with us that you can't go along with the rest of the organization in a worthy cause like this, why, Mister, just pack up your tools and go some place where you'll be happy. They don't want you to keep on being unhappy here."

And I always got my check. Believe me, this is the only workable system. Nobody—just nobody wants to shell out money for intangibles. And nobody living today will live long enough to just *talk* a thousand men into giving, without a club to put the deal across. Why people are that way, I wouldn't know.

If it's a good thing for the community, let the head men get to-

Remember the time someone cut a pair of soles out of the new engine-room belt? The old man was fit to be tied!



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...electric, gas, diesel or L.P. gas?

No two jobs are exactly alike, so there's no such thing as one "best" power type. Which type is best *for you*?—that's the important question. The only person who can give a really *unbiased* answer is one who knows them all, and knows where they fit.

That's your local CLARK Dealer. He carries electric, gas, diesel and L. P. gas units—and he's got no ax to grind for any one. His object is to provide the one that's best for you. For example, careful application analysis often proves that *electric* trucks are best for certain jobs because of these advantages:

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★ **Long life, less maintenance—electrics have fewer, simpler moving parts**

★ **Smooth, vibration-free handling of fragile loads, less wear on truck**

★ **Quiet, clean operation**

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4 **Safer, smoother stops—with CLARK's positive-controlled, reverse torque braking.**

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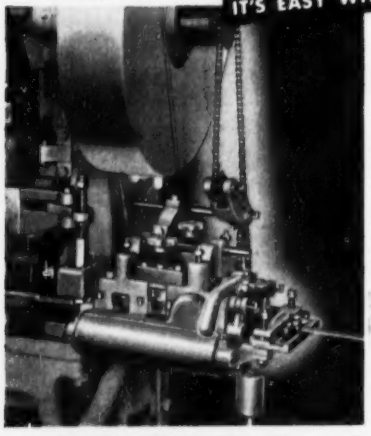

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Automatic ROLL FEEDS AND REEL STANDS

gether and decide to raise it. If everybody contributes, the amount per individual is mighty small. But let the head man say—"This, we want!" and they'll get it. It's like the income tax; we pay it because we have to.

If anybody really thinks he can depend on the aggregate man's better nature, he's got another think coming. The aggregate man ain't got that kind of a nature. Catch him in the right moon on some day out of a year, and he'll contribute—maybe. But that day is just never the same day that the foreman is collecting for a company-sponsored cause.

I've worked places where the management was not behind the drive, and I've collected very little, and then in quarter and half-dollar donations. Charity may begin at home, but it certainly don't blossom in company-sponsored but not company-pressured drives. If you want to raise money, there has to be weight behind it.

James K Matter
Detroit, Mich

•

WHEN THE QUESTION of fund raising comes up in any company, it becomes a problem which the personnel relations department likes to sidestep. Company prestige within the community is at stake. Every other company, and people outside, pass a critical glance at the amount subscribed by the organization to the many funds each year.

Not too many years ago the idea of a community fund was established. This was to end the constant fund-raising ideas, but because of greed and the inability to administer it properly, we now not only have that one, but also 999 more. Perhaps the answer to our problem lies in the proper control of the needs for funds, and a definite program.

True, people need pushing and the normal tendency is to do nothing constructive. Does this mean we must be driven by those everlasting fund raisers . . . some of whom are being paid from the funds collected? Paid, perhaps not in cash, but certainly in dinners and meetings and in many other ways that make the cost of running the campaign very high. Thus the actual amounts collected, while probably the expenditures are less than 3%, never fully reach those who should get it. The 3% loss factor—when talking in hundreds of thousands of dollars—is a large amount of cold cash that someone who is *not* needy gets. We, today, are constantly being fooled by small figures. We think in millions and billions but never stop to

think in terms of what 1 or 2% of those figures actually mean in cold cash. Just think . . . 1% of a million is ten thousand . . . not a small amount, is it?

But how should we handle the collection at the plant? The most uniform way is to let each individual decide for himself. Set quotas for departments sometimes result in the sport of trying to show off and thereby accomplish the desired end. However, this then becomes a lottery of a type—not for money, but for prestige. Is this what we want to accomplish? It does bring in the money. It does embarrass those who are not sold on the charity into giving.

Let those who want to give—give. Let's not take away or make impossible the exercise of freedom of thinking and doing within our social laws. Let us post notices on the needed funds, create interest, and play on the individual's sense of right, but never *demand* that anyone give. Never threaten the job or even hint at such thinking. The foreman has a job of selling to do. But, again, no company has the right to judge a foreman on his ability to raise funds. The foreman is a manager of men for production . . . not a salesman.

Let the personnel department develop the fund-raising program and sell the people on giving. True, the foreman cannot tear down company policy. He must, regardless of his desires, go along with the plans. This he does because he is a manager, and should have some say in company policies. This is not always true, but certainly should be.

Let's not dictate to our help on what they should or should not contribute to; we are all human and we

"You mean after I finally worked out a way to take it with me?"

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all have ideas as to what we, personally, want to do to help others. Let's enjoy our freedom to do so, whether it be a solicitation for the latest wedding, a major community disaster, or one of the regular yearly fund drives. We will all contribute if we are properly appealed to, and not directly driven into it.

Charles D Townsend
West Hartford, Conn

•

WELFARE DRIVES FOR worthy causes are all very well and seemingly necessary in this somewhat complicated civilization of ours, but we'll have to admit that they are a pain in the neck to a lot of people. Somehow or other it isn't Christ's way of helping out the person in need any more; it's the American way of driving most of the people to chip in.

The business-like way in which most drives are conducted certainly does remove the spirit of "giving" from the effort. To me it is like giving from the heart by means of a healthy persuader. Then again, if we leave it up to the individual entirely, the raising of necessary funds will certainly be a flop. You can bank on it that in any voluntary scheme the burden will fall on the few who usually feel the need of helping out their unfortunate brothers in distress. A big percentage of "givers" tend to take the "let George do it" attitude until pressure is brought to bear through well-organized techniques.

No matter what kind of a voluntary scheme you adopt, it will always result in the suckers bearing the burden. I use the term suckers with no feeling of disrespect to the willing givers, because I have a strong bond of sympathy for the

"You ought to know better than to come out here in a dress with metal buttons!"

STANDARD CARBIDE TOOLS

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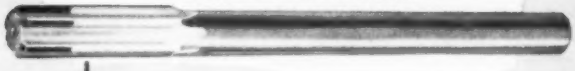

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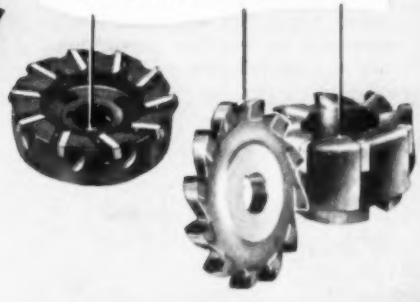
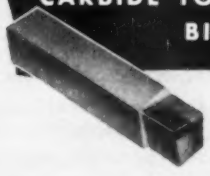


CARBIDE TOOL BITS



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REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

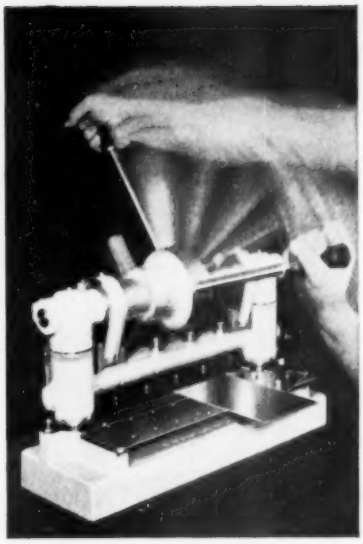
sincerity of their sacrifices. The spirit of giving to our brothers in distress, first exemplified by the Great Teacher almost two thousand years ago has had the edge worn off through abuse and misinterpretation. You cannot regiment the spirit of love, but you can, by systematic coercion —subtle though it may be—extract from the unwilling in order to meet your quota.

Now that we have arrived at an understanding of what constitutes "giving," let us confine ourselves to making the best of a situation thrust upon us by go-getters whose purpose is to raise the money regardless of to how it is secured.

Usually the scheme is to make each unit—factory, school, service club, or what not—responsible for its share of the total amount assigned to a certain community. The head of the firm dumps the pain in the neck into the laps of a committee who in turn pick out the real suckers who have to wield the shovel of action. The five-star big shot of the shoveling team finally gets around to worrying the foreman of the shop and swishes his hands happily at being able to dump the baby on another doorstep. Drive or no drive—worthy or not—the foreman isn't hired to be used as a can opener to extract shekels from the men of his department, and if he has any guts at all he would object to having the job thrust upon him.

If, as usually happens, several of the men of the shop fall heir to the job of digging up the cash—a committee appointed by a committee appointed by another committee—they use up valuable company time

"Quite a substantial savings in manhours right here!"



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in order to complete the clinking of the coins. The hard-giver-uppers get sore at the committee because of the pressure brought to bear on their pocketbooks, and instead of having that feeling of satisfaction for their part in helping someone in need, they brood until time heals the wound.

Inasmuch as welfare drives are with us to stay, we might as well make the most of it and decide upon some scheme that will work smoothly in getting the money from the employees. To stipulate a certain sum for each man to contribute is rather unjust to those whose earnings are considerably less than others. The jovial janitor whose pay has to stretch far enough to support his wife and eight kids cannot be expected to contribute the same amount as Wellington Bigshot in the head office. It seems strange that the poorly-paid worker is usually more willing to give out than some who are in the top bracket; nevertheless, his willingness should not be imposed upon.

I don't like the idea of deducting from a man's pay any more than we have to. The churches seem to thrive on pledge cards although there are many who make a pledge and have no intention of making it good. Pledges won't work in industry; the only effective system calls for the money placed on the barrelhead. Passing the hat is conducive to bad leaks and should be ruled out as ineffective and dangerous. Whatever is done should be done without any worry to the foreman, or the first thing we know we'll have to put on a drive for frustrated executives.

J Homewood
Ontario, Calif

•

IT COMES AS shocking surprise to me that any firm could even contemplate the collection of charitable funds by compulsory methods. Such methods make a mockery of the principles of charity which bases its success on the appeal to the individual as to its worthiness or otherwise.

The giving of charity is an individual matter and for any firm to decide that one cause is more worthy than another is presumptuous in the extreme. The whole point of the charitable donation is that it can be given or withheld at the discretion and at the dictates of the conscience of an individual. One man may give all his spare money to cancer relief because he has a phobia about cancer. He is not going to take kindly to the idea that the ragged heathen should be converted to Christianity with his money.

Stacking shingles to the rafters at Bird & Son, Inc., Chicago

How to boost your stock ...with the boss

You can cut materials handling time up to 50% and more all along the line—from receiving, clear through to shipping—with TOWMOTOR! Many users have more than doubled storage space. And only TOWMOTOR gives you TowmoTorque, the amazing new drive that eliminates clutching and gear-shifting. Plus effortless TOWMOTOR Power Steering! Plus revolutionary new Diesels with Cushioned Power! Plus time-tested Preventive Maintenance! Send for booklet describing TowmoTorque and Power Steering. TOWMOTOR CORPORATION, Div. 5605, 1226 E. 152nd St., Cleveland, Ohio.

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you have precision problems, too!

As swift technical advances are made, they bring new and interesting production problems. That illustrated is a good example. Axelson, with its experienced designers and engineers, is assisting more and more firms in the solution of their metal turning problems. Axelson lathes are well known for their ability to sustain heavy loads over long periods, to produce precision work with accuracy. Axelson designers and engineers contrive special attachments that answer Industry's need for intricate work. If you want a solution to the problem worrying you, get in touch with Axelson or your nearby Axelson representative.

Write for Axelson Lathe Bulletin #5304.

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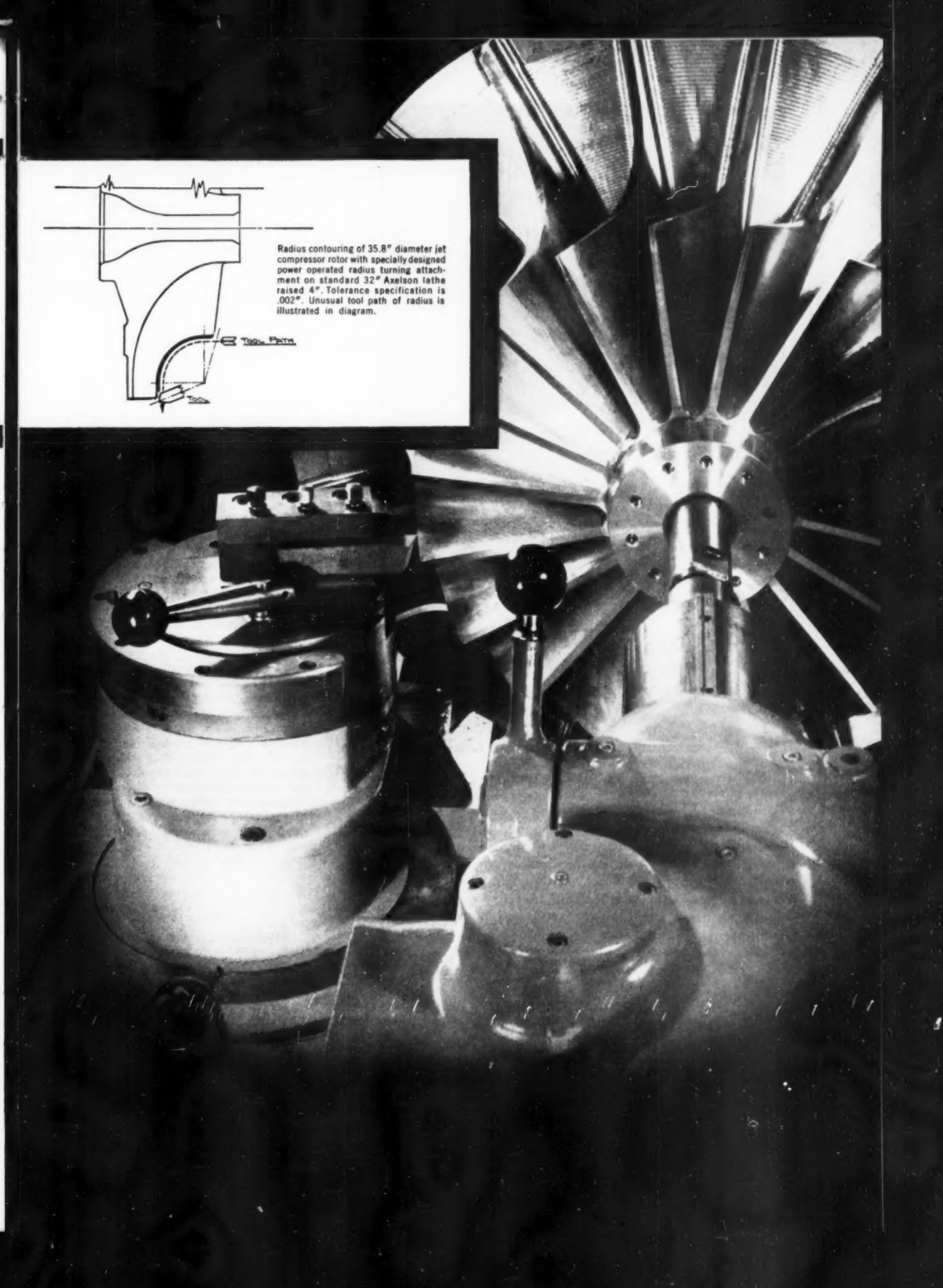
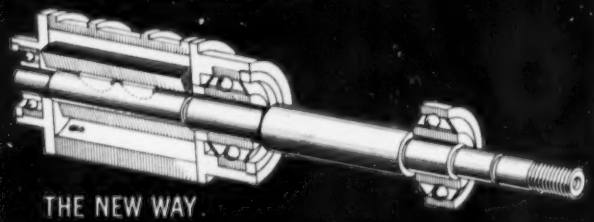


Radius contouring of 35.8" diameter jet compressor rotor with specially designed power operated radius turning attachment on standard 32" Axelson lathe raised 4". Tolerance specification is .002". Unusual tool path of radius is illustrated in diagram.

When you look at air tools . . . LOOK INSIDE

THE OLD WAY

A two-piece shaft, with male and female tang drive; double bearings required at center of tool.



THE NEW WAY

A one-piece shaft, with keys to drive the rotor which "floats" on the shaft; only one bearing needed at center of tool.

An ordinary air tool has a two-piece shaft, joined by a male and female tang. This tang drive is subject to excessive wear, even when double bearings are used for support. When wear occurs, it means replacement of the entire shaft, and an expensive rotor.

A Buckeye air tool has a one-piece shaft, connected to the rotor by two keys; the rotor "floats" on the shaft. The keys are not subject to as much wear as the tang drive, and even when wear does occur, the keys are easily replaced at very low cost. The shaft and rotor continue in service.

The point is simply this: you can expect better service—at lower cost—from your Buckeye tools.

What are you waiting for?

Buckeye Tools CORPORATION

DIVISION 15 • DAYTON 1, OHIO

Portable Air and Electric Tools for Industry

IN CANADA: Joy Manufacturing Co. (Canada) Ltd., Galt, Ontario

The less a firm concerns itself, officially, with the collection and payment of charitable funds, the better for all concerned. By all means, organize collections for the giving of wedding presents or for the giving of money to those bereaved or afflicted with hardship, but confine these collections to those who know the recipient personally, and keep them on an unofficial level.

When an employer tries to impose a rule that this or that sum of money shall be donated to charity by each individual in his organization, then the money ceases to be charity and becomes a compulsory levy. Why not carry the idea a stage further and make it a tax? It is the same thing under a different title.

The way for a firm to collect money painlessly for charity is to give the donors something for their money. A manufacturing organization is a small community and it is not difficult for charitable drives to be organized in such a body. Things that are used in Britain for the raising of funds for charitable causes include dances, sports days (athletic displays) concerts, stage plays, social gatherings at which card games are played, together with Bingo. The profits from these activities are devoted to charity. This method has the advantage of improving worker morale; the donors get something tangible in return for the money they have paid for admission, and a good time is had by all.

Such affairs are usually organized by an independent committee of employees and the management only participates when they are approached by the committee. Generally, the management is liberal and supplies the accommodations, such as the works canteen, and the staff needed for organizing such things.

"Mostly about dames. What do you?"

They also fork out any capital needed to float the venture.

We, in Britain, have a prejudice against begging in any shape or form, hence the "flag day." Collectors for charity give the donor a small token such as a cardboard flower or other acknowledgment which may be worn in the coat to indicate that he has donated. The collectors feel that they are not begging because they are giving a token in return for money, and the donor does not feel that he has been imposed upon.

If foremen are expected to make collections for charity, then it may be regarded that the particular charity has the official blessing of the management. In some firms, this would prejudice the workmen against donating and that is one reason for a firm dissociating itself officially from a charitable collection.

The collection will yield bigger returns if the prettiest girl in the organization is appointed collector. She should not be concerned directly with production, but employed in the administrative side of the business so that she will be a comparative stranger to the men in the shop. Such tactics will make donors pay up with a smile since they feel that they have got something for their money in the way of a pleasant impact on the senses.

Lists of donors and the amounts they have given are to be avoided. Any threat of writing down names and amounts is very much like highway robbery. Men do not like to think that a private matter like a charitable donation can be the subject of comment or criticism. The collection should be made in a closed and sealed box with suitable apertures for the insertion of cash or bills. Anonymity must be the rule when collecting for charity.

Clifford T Bower
London, England

•

THE COMMUNITY chest is a fine idea, and we all have a duty to our community. It should not be necessary, however, for the foreman to tell the employees how much they should donate. Employees like to make up their own minds and are resentful when told they are expected to contribute a fixed amount.

The company has no right to expect a foreman to do the job alone; this is a job for each one of us. The firm itself should get behind this drive. It should call a meeting of the foremen, and also one composed of the union chairman and stewards. With both the union and foreman committees to present the various ideas and plans, there should be no

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New CESCO Cover Goggles fit well over all popular styles of glasses— even over extreme types such as these.
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Lightweight, sturdy plastic with contoured edges. Weight is well-distributed for comfort and safety.
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Slots in edges of lens frames and rings are offset to baffle air flow.
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Three types, all fully adjustable—Comfort King round rubber, flat rubber, or elastic.
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Baffled type for welders.
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The *NEW* CESCO series 548 and 549 Cover Goggles are 20% larger than former cover goggles and will fit comfortably over all popular styles of men's or women's glasses. Newly designed, contoured edges eliminate pressure points on the nose and seal out flying particles or light flashes. Larger air space within goggles reduces fogging.

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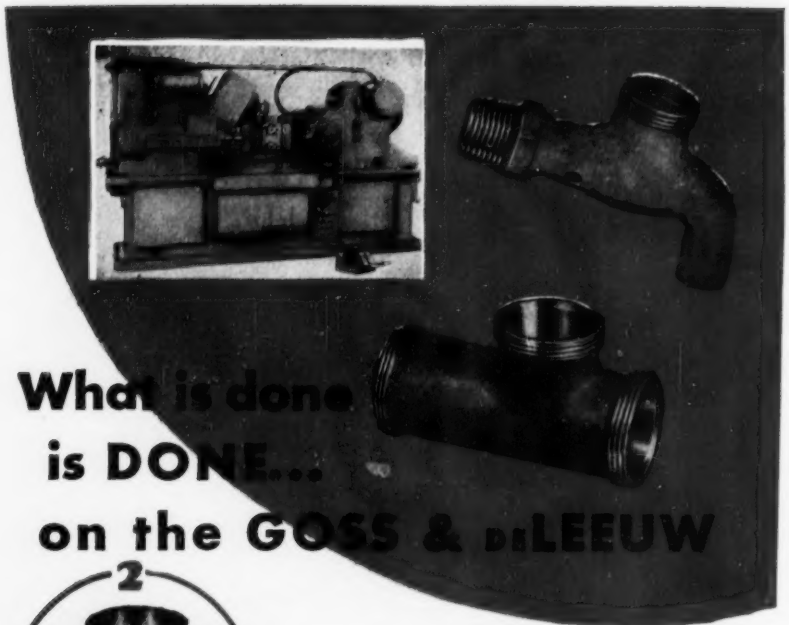

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There are no half-finished pieces lying around at the end of the day when you put your work on this outstanding machine.

The "1-2-3" feature—available only on the Goss & De Leeuw Automatic Chucker —provides the means of finish machining three ends of a part without changing set-up.

Note some of the typical parts machined. Ask for illustrated literature giving further details and send samples of your work for a cost estimate on handling it on the Goss & De Leeuw.

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difficulty in making a good showing.

Many companies have a community chest representative come to the shop or plant and give a short talk. The organization also has a film to show for anyone who is interested.

Many firms will not take the time or go to the expense of payroll deductions by week or month. Yet this method is encouraged by the community chest as one that will bring in at least 50% more money.

The committees will make a much better showing by the power of suggestion and dramatization than they would by a demanding attitude. Dramatize the benefits of the community chest. Merely stating the facts is not enough. Dramatize and make the truth more interesting and vivid. This method should work successfully without any hardship on the employees.

A E Salmons
Philadelphia, Pa

•

IN A RECENT ISSUE you asked for ideas on how to raise funds in various departments in factories.

We have one in our GE plant here in Bridgeport, started by our superintendent; it has been functioning, to my knowledge, about eighteen years.

Each year, in February, those participating pay $2, and *only* those participating enjoy the benefits. It was a fund started by our superintendent to eliminate collections every time some worker's relations, or parents died, or for someone who had been out sick for a lengthy period.

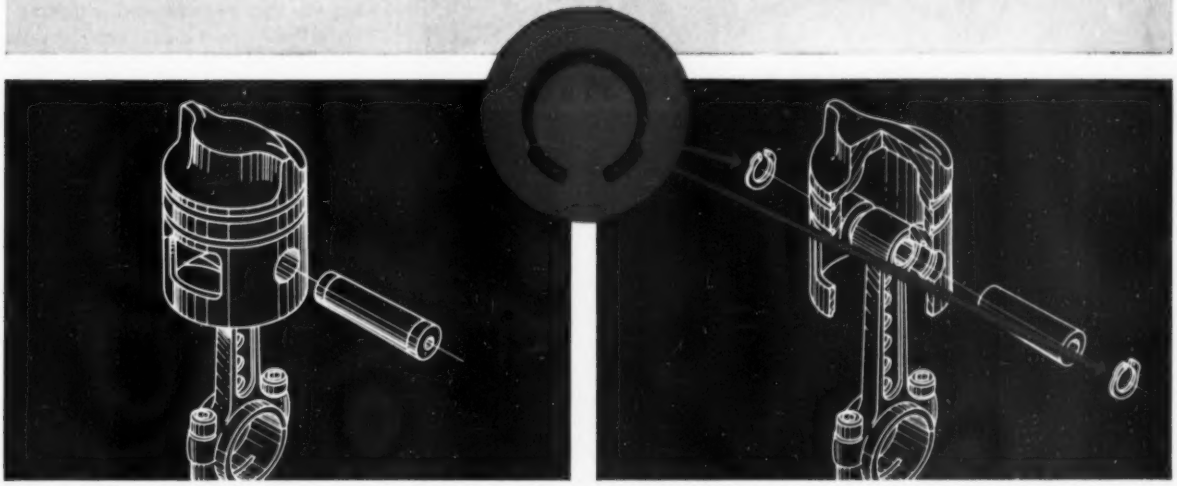
We have a chairman and vice-chairman, secretary-treasurer, and they head up a committee of about seven or eight members who meet once a month for an hour—in the summer, every two months.

We maintain a checking account, and also a savings account. Sometimes the interest on the savings has been enough to buy a floral piece for a funeral.

If one of our members has been out sick for three weeks, at the end of the third week a check for $15 is sent him; if still out three more weeks, another $15 check is sent. If the person still remains out, a meeting is held, and a vote taken as to what he is to be given next. If he has a fairly large family, that is taken into consideration, and a reasonable amount is voted.

When one of our members dies, a $10 floral piece is sent his survivors; should his brother, father, son, or daughter succumb, an $8 piece is sent.

2 Waldes Truarc Rings Replace 2 End Plugs ...Eliminate 3 Operations...Save $.066 Per Unit



OLD WAY Two inserted-plug type wrist pin locks hold wrist pin in place. 3 operations involved: costly machining, pressing in place, post-assembly machining. Costly maintenance problem—resulting from end plugs hammering loose.

TRUARC WAY Two Truarc Inverted Retaining Rings (Series 5008) hold wrist pin in place. Truarc Rings snap into grooves easily cut in piston, provide positive lock . . . practically eliminate maintenance costs. Quick assembly, disassembly.

Titan Chain Saws, Inc., Seattle, Washington, uses 2 Waldes Truarc Rings to replace old-style inserted-plug type wrist pin locks in their Titan chain saws. Use of Waldes Truarc Retaining Rings eliminates 2 press fit end plugs. Machining of plugs, pressing in place, finish machining—no longer required. Truarc way holds rejections to a minimum. Unit efficiency is greatly increased.

Redesign with Truarc Rings and you, too, will cut costs. Wherever you use machined shoulders, bolts, snap rings, cotter pins, there's a Waldes Truarc Retaining Ring designed to do a better job of holding parts together.

Waldes Truarc Rings are precision-engineered . . . quick and easy to assemble and disassemble. Always circular to give a never-failing grip. They can be used over and over again.

Find out what Waldes Truarc Retaining Rings can do for you. Send your blueprints to Waldes Truarc engineers for individual attention, without obligation.

USE OF 2 WALDES TRUARC RINGS PERMITTED THESE SAVINGS PER UNIT:

OLD WAY	
Cost of 2 end plugs Cost of pressing in and machining	$ .169
TRUARC WAY	
Cost of grooving piston Cost of 2 Truarc Rings	.103
Saving per Unit	**$ .066**

For precision internal grooving and undercutting... Waldes Truarc Internal Grooving Tool.

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WALDES TRUARC RETAINING RINGS AND PLIERS ARE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 2,382,947; 2,382,948; 2,416,852; 2,420,921; 2,428,341; 2,439,785; 2,441,846; 2,459,165; 2,483,380; 2,483,383; 2,497,902; 2,497,903; 2,491,306; 2,509,081 AND OTHER PATENTS PENDING.

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We also take care of all our retired members who had always belonged to the Fund prior to their retirement. They share as our active members, but they are not assessed anymore when they retire.

Each February this committee acts as solicitors for the $2. A report is made by the secretary-treasurer as to what money was collected, how it was dispersed, and the current balance in the savings and checking accounts.

No high pressure is used on anybody, as we've had nothing but praise from all those who benefited in any way. And it *does* do what it was originally intended to do—eliminate collections.

Gordon F Monahan
Bridgeport, Conn

•

LAMBS OR GOATS?

IT IS SURPRISING how many employees think the big boss is some kind of monster who wants the most amount of work for the least amount of pay.

They don't even consider that most big bosses are fine men who have succeeded by hard work. They have never had the opportunity to sit down with him and get acquainted. He is usually interested in their problems and welfare. The big boss knows the success of any organization depends on every employee on the payroll.

Most of us are aware our past troubles have been because the employees have not had the opportunity to find expression in the area with top management.

We know it takes more than efficient machines to provide top quality production. In the past, em-

"What a pity! A nearsighted machinist with a nose like that!"

ployers have provided the employee with cold facts. The individual or group is told to apply them, with no opportunity to share in policy methods, or discovery of facts. A cold blueprint does not change a person's reasoning or performance. A general discussion with the employees will get them interested in doing a more careful job. It will make them feel they belong.

We all want the same things from life. We want money and the things it will buy, but money alone will not produce anything. Neither will smart management or skilled labor, unless we have guidance and two-way cooperation.

Several years ago as a member of a successful suggestion system, we had a dinner once a month for members of the committee. Each foreman and one employee from a department were members of the committee. Every three months each employee who had turned in an adopted suggestion would be invited to a dinner to receive his award. All employees whose suggestions were rejected would receive a thank you letter encouraging them to try again. In safety, as well as suggestions, we had an active employee participation. In my opinion these get-together dinners are good for both morale and efficiency.

A E Salmons
Philadelphia, Pa

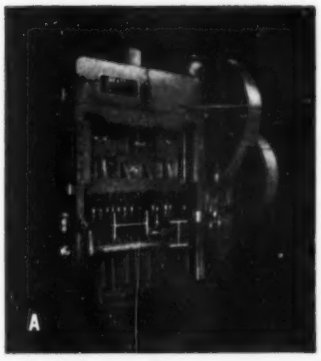
•

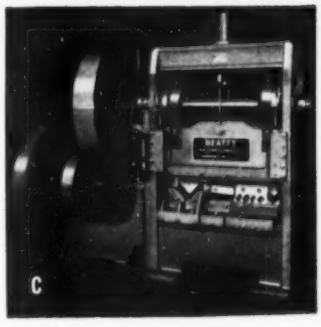
COMPANY ENTERTAINMENT of the working force as a means of improving morale through better personnel relationship is worth trying. But there are more satisfactory and stronger methods for eliminating that instinctive distrust that some workers have for their bosses.

Morale depends upon a great many factors. In its initial stage of development it is an expression of group opinion; the sum total of the feelings of all concerned. It is manifested in the presence of goodwill among employees as demonstrated through participation in the work of the organization.

Management can organize many social get-togethers to improve personnel relationships and make working together easier, but they will be to no avail if fundamental principles of good management are lacking in day-to-day relations with the workers.

It is important to examine some management-employee relations that may make or break morale. An employee's loyalty and enthusiasm for his employer or firm is usually commensurate with his attitude toward





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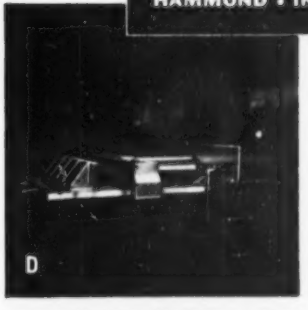

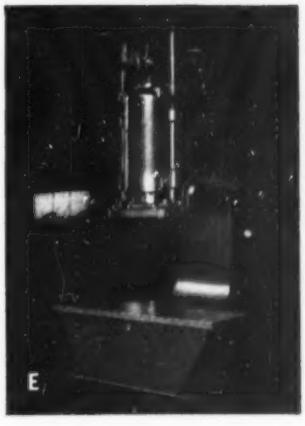

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his job. It is of the foremost importance, therefore, that grievances and problems which are irksome to employees and which destroy morale should be recognized and adjusted.

It is merely confessed management incompetence which minimizes these maladjustments in morale on the ground that friction must exist wherever human beings work together, or assumes that all matters requiring adjustment will eventually come to a head. Time and experience have demonstrated that most troublesome problems of employer-employee relations result from an accumulation of seemingly minor matters and lack of attention to what men are thinking and want from their jobs. Eruptions in human relations can be avoided only when managers understand workers' attitudes.

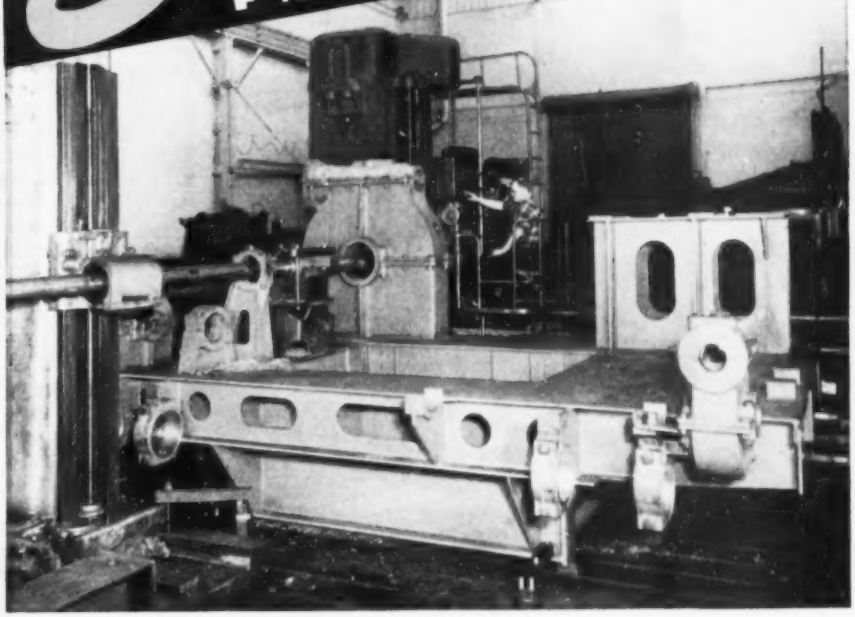
In my opinion, company entertainment of the working force will only play a minor role in developing better relations. More important are the factors of leadership, recognition, organization, dependability, definite responsibility, and equitable pay.

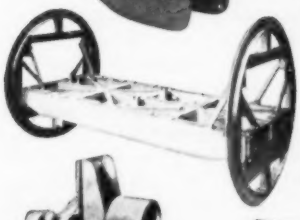
One means of promoting confidence of the worker in management is the supervisor's understanding of the worker's need for recognition. No matter how lowly his occupation, a worker likes to be regarded as an essential cog in the wheel. Unfortunately, many managers are too preoccupied with their own positions to express proper consideration and courtesy to employees. They give short answers and orders without explanations, and, as a result, create a lack of respect.

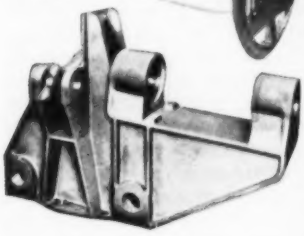
Better than company entertainment of the working force as a means of fostering morale is organization dependability. Perhaps above all else, workers want a reasonable ex-

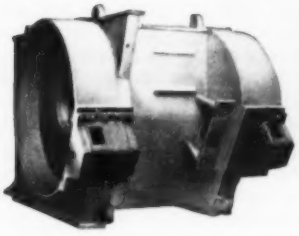
"That certainly wasn't a very kind thing to say about a dead motor!"

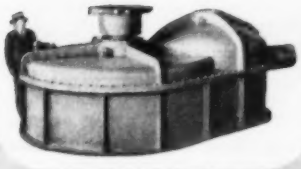
Steel-Weld FABRICATION











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Above you see a Steel-Weld Fabricated trolley frame for a heavy crane. This and the units illustrated at the left are typical of thousands of welded steel parts and assemblies produced by Mahon for many industries throughout the country. Facilities are available within the Mahon plant to do the complete job from the drawing board to finished machining. If you have parts or assemblies that could be redesigned and produced to better advantage through Steel-Weld Fabrication, or, if you require a limited number of large, heavy pieces in which pattern costs are a consideration, you can turn to Mahon with complete confidence. You will find in the Mahon organization a unique source with complete, modern fabricating, machining and handling facilities to cope with any type of work regardless of size or weight . . . a source where skillful designing and advanced fabricating technique are supplemented by craftsmanship which assures a smoother, finer appearing job embodying every advantage of Steel-Weld Fabrication. See Mahon's Insert in Sweet's Product Design File, or write for further information.

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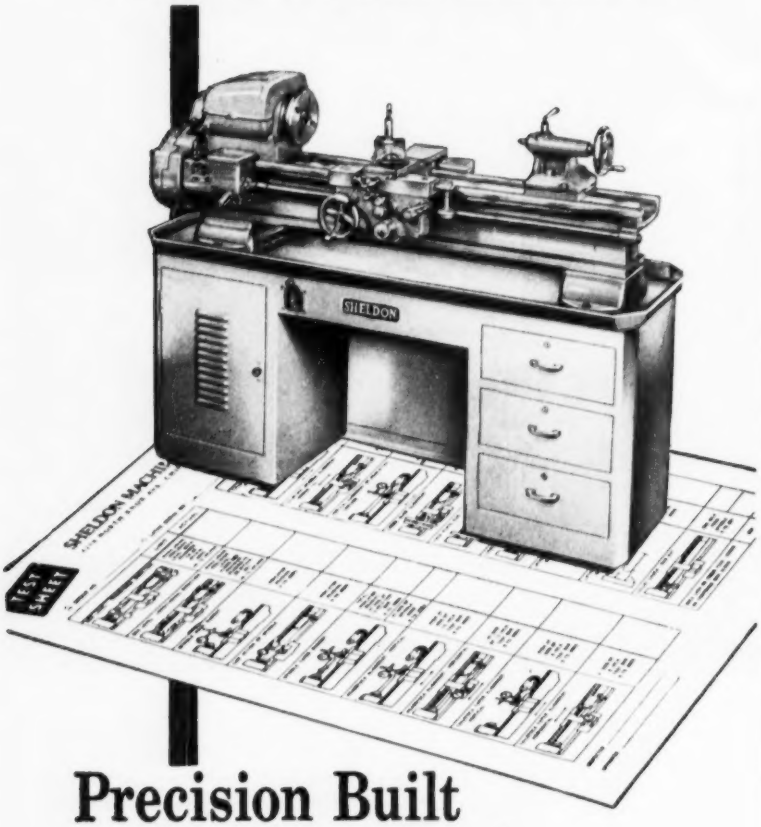
CHICAGO U. S. A.

Tool Room Lathes



Precision Built *for* Precision Work

Each SHELDON Lathe is a precision machine tool that in final inspection has passed the 19 accuracy checks on the SHELDON "Inspection Test Sheet".

Produced by modern methods with the finest special machines, these 10", 11" and 12" (swings 13") lathes are quality built on a quantity production basis. Selling at quantity production prices they are today's best lathe values.

Write for Catalog with Test Sheet

SHELDON MACHINE CO., INC.

4234 North Knox Ave., Chicago 41, Illinois

pectancy of job security and regular pay. They want to feel also that they will receive deserved period increases.

All workers feel that they have rights in their jobs if they perform efficiently, and that they are making a contribution to organization welfare which deserves reward by way of assurance that their jobs are secure.

There is another morale-destroyer that stems from bad bossing, and that is lack of definite responsibility. A raft of company dinners will fail to promote good relations when responsibility and authority are divided. There is no more certain way to destroy morale than to give workers assignments and then have them discover that their success is dependent upon pleasing not one but several persons with conflicting notions as to what constitutes a good job. Lines of authority and responsibility in this connection must be established.

Perhaps the best morale-builder is the assurance a worker has that he is receiving equitable pay for his work. This means that the pay must represent a reward that is fair in terms of what various jobs require of those who fill them.

For many firms this means the examination of jobs and men through the use of two of management's new techniques; job evaluation and merit rating. The former discovers what jobs require of men, and the latter measures how well men measure up to these requirements.

There is no denying that direct contact of top management with workers does have a share in improving personnel relationships. An absentee management, where workers seldom if ever see the real heads of a business, has two strikes on it to start. Many Personnel men feel that it is important for top management to be seen, at least occasionally, by the rank and file of workers. The president of a company who knows his way around the plant and company properties, who is not above recognizing his employees and occasionally stopping to have a word with them, is perhaps less likely to undergo the experience of facing an extremely hostile employee group making impossible demands upon him. Nor is such a president likely to do anything to increase turnover. Neither wages, hours of work, bonus or insurance plans, nor comfortable working conditions can attract employee loyalty if there is a haughty, impersonal aloofness on the part of top management to the rank and file.

This does not mean that a company's top executive has to attend

every employee beer party or bowling game, but it does mean that it will pay dividends for him to be seen at company gatherings, to be pleasant and cordial when he encounters employees around the works, on the parking lot, in public places, and elsewhere. If he visits plant departments his attitude toward employees will be followed, to some extent at least, by the foremen and supervisors who observe him at these times. Thus, he has an opportunity to establish a pattern for relations between all executives and the rank and file.

One plant of which I have knowledge has a way of building better employee relations through periodic meetings of a semi-business nature. This company endeavors to get employee groups together several times a year. Luncheons are held, attended by the superintendent and assistant superintendent, and groups of six or eight foremen, for the purpose of discussing labor relations and to give the foremen an opportunity to express the viewpoints of all employees.

I knew of an owner-manager concern where the boss treated his workers to a company dinner twice a year. You could ask this boss about practically anything and he was always open for suggestions on work problems. No worker ever thought that this boss lowered his prestige any by eating with him, and hearing his complaints as well as suggestions.

There should be no claim that an occasional company-sponsored dinner for the meeting of the top-side and employees will work to the detriment of morale and savor of paternalism. In many plants, the individual tends to be lost in the crowd and the boss doesn't know him. The per-

Remember the first day in the new shop? Your fingers are all thumbs, and you know you're going to do something foolish, with everybody watching you.

Are You Looking for PUMPS *Like These?*

TUTHILL MODEL L Pumps are Designed to Meet Your Small-Pump Replacement Needs

MODEL L
For lubricating, hydraulic, transfer, circulating, burning oils service. Built in 5 sizes.

The Tuthill Model L is the pump that introduced the first practical mechanical seal for leak-free performance and low power consumption. This compact, efficient positive displacement internal-gear rotary pump is offered in the following types to fit the pump to the need—in capacities from ⅓ to 6 g.p.m. and pressures to 600 p.s.i.

MODEL LD
For burning oils service. Flanged ports, 3-bolt mounting. Built in 3 sizes. Available also with built-in ball bearings as Model LDK.

MODEL LF
For lubricating service. Flange mounting without shaft seal. Choice of internal or external porting. 3 sizes.

MODEL LH
For hydraulic service. Pressures to 600 p.s.i. 4 sizes.

MODEL LK
For lubricating, hydraulic, transfer and circulating service. Built-in ball bearings. 4 sizes.

MODEL LPV
For lubricating, transfer and circulating service. Built-in adjustable by-pass valve. 3 sizes.

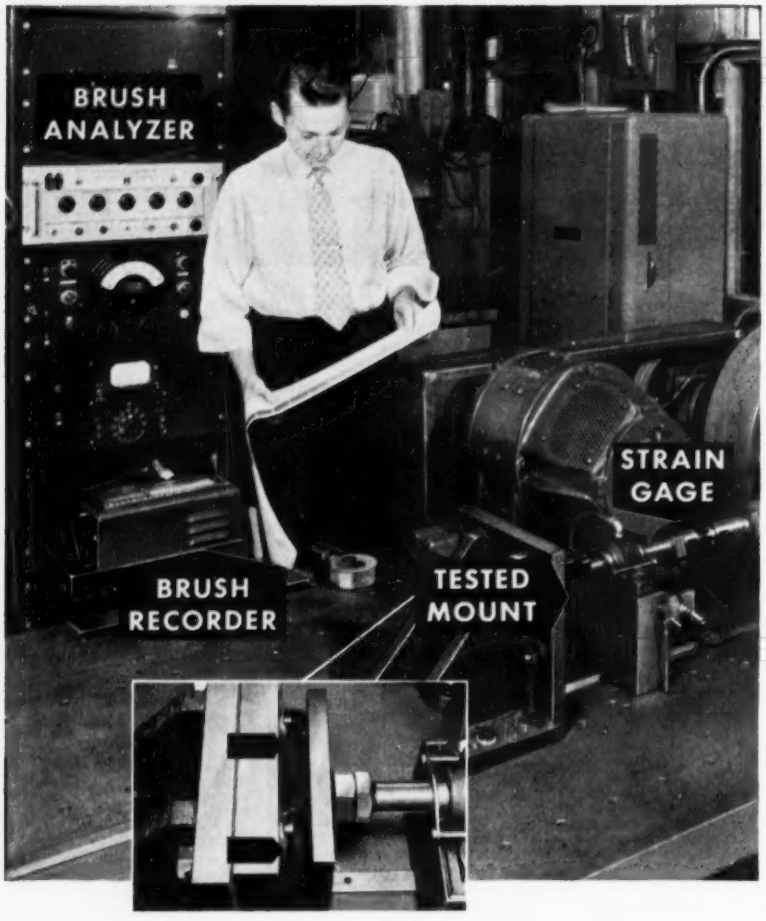
MODEL LSA
Stripped pump for built-in applications in lubricating, hydraulic, transfer and circulating service. Includes Model L cover, idler gear and rotor. 5 sizes.

MODEL RL
Automatic reversing feature permits driving pump in either direction without changing direction of flow or changing port positions. For lubricating and hydraulic service. 3 sizes.

Write for Catalog No. 101 on Model L pumps. Also ask for Tuthill Pump Guide on complete line of Tuthill pumps.

TUTHILL PUMPS FOR THE PURPOSE

TUTHILL PUMP COMPANY
939 East 95th Street, Chicago 19, Illinois
Canadian Affiliate: Ingersoll Machine & Tool Company, Ltd. Ingersoll, Ontario, Canada



VIBRATION STUDY

saves time and money with Brush Analyzer

HERE, in the plant of a large automotive manufacturer, this test of vibration characteristics of rubber engine mounts requires no laborious plotting of test data. The shock mounts are tested under dynamic conditions. Using strain gages on the actuating driver, the Brush Recording Analyzer charts test results instantaneously while the test is underway. Saves valuable engineering time, and the charts provide a complete history of test. Find out how *you* can simplify the solving of many electrical and mechanical test problems with Brush Instruments. Write for bulletin F-618.

For the finest electronic products for instrumentation, acoustics, piezoelectric materials, ultrasonics and magnetic recording—look to Brush. Brush Electronics Company, Dept. U-5, 3405 Perkins Avenue, Cleveland 14, Ohio.

BRUSH ELECTRONICS COMPANY

ELECTRONIC INSTRUMENTS FOR INDUSTRY
PIEZOELECTRIC MATERIALS • ACOUSTIC DEVICES
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BRUSH 6 ELECTRONICS

formerly
The Brush Development Co.
Brush Electronics Company
is an operating unit of
Clevite Corporation

sonal touch and interest engendered by the company dinner keeps the supervision from being aloof from the supervised.

Some old-time bosses will assure you that all this business of direct contact with the men is dangerous nonsense. Attend company dinners with the men, they say, and the workers will hit you for a raise the next day. Actually it does not work out that way. Most workers in industry are realistic. They understand that the boss is bound by budgets, and set pay schedules, and will do only the best he reasonably can for them.

The demonstration of the efficacy of "one good turn deserves another" has been proved in the case of Schwab and other industrial leaders who practiced the direct-contact method of talking directly to their employees and treating them as important persons in the success of the organization. The workers usually responded to these good turns by giving their best to the company.

Some executives believe that familiarity breeds contempt. Others say that though familiarity may not breed contempt, it takes the edge off admiration. In my opinion, familiarity of a boss with his workmen as evidenced by his skill or facility in dealing with them will do him no harm. Managers of men who realize that they are dealing with men and not machines, know that the friendly word or judicious praise often gives a spur to more effective work on the part of their subordinates. Above all, he should remember that friendship is worth cultivating:

"He who has a thousand friends,
Has never one to spare,
And he who has one enemy,
Will meet him everywhere."

Harry Kaufman
Philadelphia, Pa

"Well E. T. . . . we finally got a good floor wax!"

...with TYCOL lubricants on hand!

Heavy-duty cutting operations? Here's what happens when you switch to Tycol Afton oils! A well known Engineering Company (you'd recognize the name instantly) recently tested cutting oils used to shape 14" gears on a Gleason Bevel Gear Generator. Their findings: after the first rough cut around, with competitive oils, they had to grind a full ⅛" off the cutter. With Tycol Afton 8, they hobbed *two* gears and took off only .013". Afton oils are non-corrosive . . . and so stable they're widely recommended as hydraulic oils! They serve a triple function as coolants, lubricants, and hydraulic media on the same machine . . . the heavier the cut – the better they perform. It will pay you to find out why – by contacting your local Tide Water office!

Over 300 Tycol industrial lubricants are at your disposal . . . engineered to fit the job!

REFINERS AND MARKETERS OF VEEDOL . . . THE WORLD'S MOST FAMOUS MOTOR OIL

TYCOL
INDUSTRIAL LUBRICANTS

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Philadelphia • Chicago • Detroit
Tulsa • Cleveland • San Francisco
Toronto, Canada

TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE - NEW YORK 4, N. Y.

Meeting Steel Emergencies

Here are records of six emergencies faced—and met—by Ryerson Steel Service:

Shutdown Averted

4:30 p.m.—1000 lbs. bar stock urgently needed to avert shutdown of night operations. Order processed by office at 4:35; goes to warehouse at 4:41. Steel leaves Ryerson plant at 5:30; arrives at customer's plant (7 miles away) at 6:05 p.m.

Shipped in 1½ hours

10:15 a.m.—two plates needed immediately. With customer still on phone, Service Department alerted. Steel sheared to size and on its way by 11:45 a.m.

Night Shift Comes Through

3:00 p.m.—order phoned in for 20,000 lbs. of sheet steel. Needed (90 miles away) at 8:00 a.m. next day. Working through the night, Ryerson warehouse crew cuts the steel—loads it on truck that leaves at 6:00 in the morning. Shipment arrives at customer's plant on time.

Breakdown Saturday—Production Monday

Saturday—11:45 a.m. Emergency call. 8" alloy steel round needed to repair breakdown of main shaft. Cut during lunch hour, the 1700-lb. bar is immediately trucked to airport; loaded on cargo plane. Customer meets plane on arrival in distant city. Repairs are completed Sunday; full production resumed on Monday.

Delivery 600 Miles Away—7 hours

3:00 p.m.—200 lbs. of flat bars, in cut lengths, needed in a hurry 600 miles away. Just 2½ hours after receipt of order, plane takes off with steel from Ryerson. At 10:51 p.m. same day, customer has his steel.

Still Hot When Delivered

11:15 a.m.—Manufacturer reports breakdown; needs 2"x72"x10' plate at once—must be flame cut. Plate delivered at 2:15 p.m., still hot.

Of course, out of thousands of orders, we can fill only relatively few at such breakneck speed. However, in emergencies, the world's largest steel service organization, with 15 interconnected plants, is your best source for steel. And, despite some shortages, you can also count on Ryerson for most every day-to-day steel requirement. So when you need steel—carbon, alloy, stainless—call your nearby Ryerson plant.

PRINCIPAL PRODUCTS: CARBON, ALLOY & STAINLESS STEELS—BARS, STRUCTURALS, PLATES, SHEETS, TUBING, MACHINERY & TOOLS, ETC.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

NEW BOOKS

ADVANCED STRENGTH OF MATERIALS—*By J P Den Hartog, professor of mechanical engineering, Massachusetts Institute of Technology. Published by the McGraw-Hill Book Co, 330 West 42nd St, New York 36, NY 379 pages. Price, $8.50*

This book bridges the gap between textbooks on elementary strength of materials and the advanced books by Timoshenko on elasticity, plates, shells and elastic stability. Initial chapters are given as a senior course at MIT; the remainder of the book is reserved for graduate study. Subjects in Prof Den Hartog's book are: torsion, rotating disks, membrane stresses in shells, bending of flat plates, beams on elastic foundation, two-dimensioned theory of elasticity, the energy method, and buckling. An understanding of calculus is essential to the reader of this book.

•

ORGANIZING FOR IMPROVED PRODUCTION AND COST CONTROL—*Manufacturing Series No. 202. Published by the American Management Association, 330 West 42nd St, New York 36, N Y. 68 pages. Price $1 to members; $1.25 to non-members*

This publication presents papers and panel discussions of the AMA manufacturing conference, April, 1952. Subjects covered are: developing cost awareness, modern control of factory costs, a materials-handling improvement program, organization of the manufacturing executives job, and a panel discussion on maintenance in respect to organization of personnel, preventive maintenance, industrial engineering and maintenance, and maintenance costs.

•

A GLOSSARY OF TERMS USED IN METHODS, TIME STUDY, AND WAGE INCENTIVES—*Published by the Society for Advancement of Management, 411 Fifth Ave, New York 16, N Y. 32 pages; vest-pocket size. Price $1.00*

Ninety-three management leaders of the Society, working through its Reesarch Division, spent four years compiling the 332 definitions that minimize wrangling over terminology for labor contracts and interpretations. Each of the terms and expressions is defined on the basis of its interpretation by the greatest number of people using them professionally and successfully.

BUSINESS ITEMS

A Milne & Co of New York has increased the capacity of its Cleveland warehouse by approximately 50%, due to expanded demand for solid and hollow tool steels in the area.

Combustion Engineering, Inc, is the new name of **Combustion Engineering-Superheater, Inc**, Chattanooga. There are no changes in address, personnel, etc.

Armstrong Whitworth & Co, British pneumatic tool manufacturers, is planning to build a new plant at Tynemouth, England, and will move its entire Newcastle operation there in August.

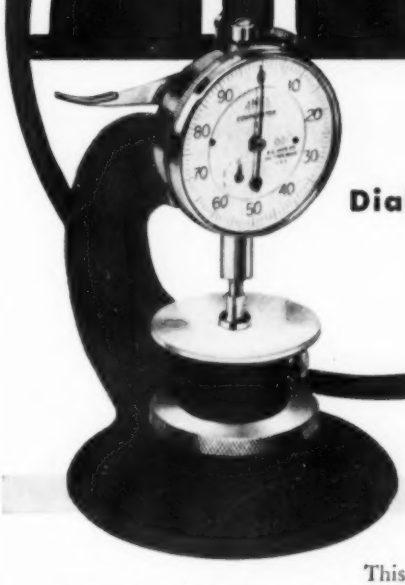
Delta Power Tool Division, Rockwell Mfg Co, Pittsburgh, has revised its sales set-up. Under the new system, four sales divisions have been set up at the firm's home office, each under a product manager directly responsible to E W Ristau, vice president in charge of power tools. The four product managers are: Ben Eldridge, Metal Working Division; Thomas C Mortimer, Woodworking Division; I G Meyer, Homecraft Tools Division; and A V Taylor, Accessories Division.

Ohio Injector Co, Wadsworth, Ohio, has acquired the lubricated valve business of **H K Porter Co, Inc**, Tulsa, Okla, and will move its equipment to Ohio Injector's Wadsworth, Ohio, plant. Transfer of equipment will be so accomplished as not to interrupt flow of orders to company customers.

Facilities for processing western steel are being built at the **Riverdale Army Ordnance** plant, near Modesto, Calif, making it possible for Riverdale to add another line for production of steel shell casings. Equipment and machinery will be furnished, installed and operated by **Norris-Thermador Co**, Los Angeles. The plant will process raw steel for Riverbank and will also supply other steel stamping and casing operations on the West Coast.

Food Machinery & Chemical Corp has purchased controlling interest in England's **Varley Pumps & Engineering, Ltd**, Brentford, Middlesex. The British firm's facilities will be used to manufacture the same products as are produced at Food Machinery & Chemical Corp's San Jose, Calif, plant.

AMES



No. 2
Dial Comparator

This is smallest in the Ames' line of high quality dial comparators and it is ideal for desk or bench use in the fine inspection of small precision parts. It is light in weight, but its broad base makes it very stable. The capacity approximates that of the regularly supplied Ames No. 202 Dial Indicator which has a dial numbered 0-100, graduated in .001" and with a .250" range. Should your job requirements differ, you can have the No. 2 with any Ames "Hundred Series" Dial Indicator. Send for Ames Catalog No. 58 covering the entire line of Ames Top Quality measuring instruments or, better still, send complete details of your Quality Control problem. Ames will suggest a solution – no obligation, of course.

Ames Long Range Dial Indicator No. 2822

Ames Dial Micrometer No. 516

Ames Dial Comparator No. 130

Ames Caliper Gauge No. 12B

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Representatives in principal cities. B. C. AMES CO. *26 Ames Street Waltham 54, Mass.*

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

COMPARE 'EM IN ACTION ... at the Show

Easiest, Safest Fork Truck to Operate. *All NEW SpaceMaster Model "E" with magnetic controls. Change speed or direction by flick of one control lever . . . timed acceleration, no jumps or jerks. Dynamic Braking eliminates 99% of mechanical foot braking. Capacities to 4000 lbs.*

5th NATIONAL
MATERIALS HANDLING EXPOSITION
MAY 18-22, 1953
PHILADELPHIA

Make Your First Stop Lewis-Shepard . . .

pick up "Fork Truck Comparison Charts" to help you compare the various makes.

Most Stable Truck of its kind. *The NEW L-S SpaceMaster Model "M" permits high stacking in less than 6' aisles . . . and complete stability is assured with exclusive articulated linkage and stabilizing casters. Capacities to 3000 lbs. Models for both pallets and skids.*

For Speedy Horizontal Hauling. *This NEW SpaceMaster Model "M" low lift is ideal for long runs. Attains speeds over 4 mph . . . requires less room than walkie trucks. Capacity: 4000 lbs. Both pallet and platform models.*

The "MASTER" Line

A Quality Fork Truck at ½ the Cost. *Safety, stability, ruggedness . . . that's what the NEW SpaceMaster Model "J" gives you at half the usual outlay. The L-S one-design-line makes the low price possible. Capacities to 2000 lbs.*

The Quality Truck in the Walkie Field. *The NEW Jack-Lift Electric low lift truck with new powerful traction motor gives twice the speed. 15% less headroom makes narrow aisle operation easier. Capacities to 6000 lbs. in pallet and platform models.*

New Compact Design *of JackStacker Truck permits operation in more narrow aisles than ever before. Articulated linkage and two additional casters for high lift stability. Capacities to 6000 lbs. Models for pallets and skids.*

The largest group of NEW Lewis-Shepard Power Trucks ever offered...

PLUS units from the L-S line of Hand Lift Trucks, Floor Trucks, Stackers, Skids, Racks . . . your most complete choice of materials handling trucks.

At the Show, you'll see the most modern, economical, and space-saving trucks on the market . . . *right at the Lewis-Shepard Exhibit.* But don't take our word for it, make your own unbiased comparison—get the handy "Electric Truck Comparison Charts" that list important buying "guides" . . . let you evaluate the various comparative merits of each manufacturer's trucks.

Lewis-Shepard invites this comparison because we are confident that our complete line of materials handling equipment will give you more of the features you want, the quality you need, and the savings you expect. Be sure to pick up your "Comparison Charts" as soon as you arrive at the Show . . . or write for them now. Use the coupon below for your convenience.

LEWIS-SHEPARD Products, Inc.
1018-S Walnut Street, Watertown 72, Mass.

Send me "Comparison Charts" and Catalogs on the following:

- ☐ New SpaceMaster Model "E" Trucks
- ☐ New SpaceMaster Model "M" High and Low Lift Trucks
- ☐ New SpaceMaster Model "J" Trucks
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WHY THE DEMAND IS UP FOR WARCO ECCENTRIC GEAR PRESSES

For fabricators of metal stampings requiring dependable, long-life equipment for jobs involving speeds of 25 to 30 strokes per minute, and where work is to be done high up on the stroke (i.e. production runs of deep-drawn parts), Warco offers an advanced line of single-point, two-point, and four-point Eccentric Gear Presses.

From the four-piece welded steel frame to the steel gears and heat-treated pinions, Warco Presses are designed to give maximum performance. They incorporate such advantages as welded steel slides with barrel-type adjustment, and air counterbalance — Warco's popular pneumatic friction clutch and brake unit with simplified push button controls — and many other features that enable Warco Presses to deliver at peak production with utmost safety — features that are constantly increasing the demand for Warco Eccentric Gear Presses.

THE FEDERAL MACHINE & WELDER COMPANY

WARREN, OHIO

Federal® WELDERS

Warco® PRESSES

BUSINESS ITEMS

General Tire & Rubber Co is consolidating all of its metal fabricating work in the former Crosley Motor plant at Cincinnati, where production of aircraft parts will start shortly. At the same time production of parts will be eased off at GT & R's Bowling Green, Ky, plant, which will be sold as soon as all production is transferred to Cincinnati.

McCulloch Motor Corp, Los Angeles manufacturer of power chain saws, is planning to build a plant at Vancouver, B C, Canada.

Federated Steel Corp, Pittsburgh, has purchased **Morrison - Drabner Steel Co, Inc**, of Cincinnati and Atlanta. Acquisition was made through two subsidiaries formed for the purpose: **Morrison-Drabner Steel Co**, which will acquire the Cincinnati operation; and **Federated Steel Co (of Georgia)**, which will take over Morrison-Drabner's Atlanta operation.

Lebanon Steel Foundry, Lebanon, Pa, has opened a Canadian office at 304 Crescent Bldg, 1411 Crescent St, Montreal. Heading the Canadian office will be Vincent J Doyle, formerly of Sorel Industries, Ltd, Sorel, Que.

American Car & Foundry Co has purchased the entire outstanding capital stock of **Avion Instrument Corp**, Paramus, N J, manufacturers, engineers and developers of fire control and missile guidance systems and electronic devices. AC & F, which will operate Avion as a division, will retain Richard F Wehrlin, Avion founder and president, as division head.

Arthur F Moul, once a salesman for **Samuel C Rogers & Co**, 66-year-old Buffalo manufacturer of machinery for sharpening industrial tools, has acquired sole ownership of the company. Mr Moul, who formerly was vice president and general manager of the firm, will be its president.

Modine Mfg Co, Racine, Wis, announces that a seven-month-long strike of its production workers ended with signing of a new contract with Local 82 UAW-CIO. Some 800 workers were on strike at Modine's Racine plant. Company's other plants, at LaPorte, Ind, Paducah, Ky, and Whittier, Calif, were not affected.

Names in the News

C M Brooking has been named chief manufacturing engineer for F E Myers & Bro Co, Ashland, Ohio, where he will direct tooling, methods and standards and cost estimating. Mr Brooking was formerly chief industrial engineer for LeTourneau Co's Texas Division.

Robert G Morgan has been named to the post of district manager of Timken Roller Bearing Co's Moline, Ill, office. **Robert L Williams** succeeds Mr Morgan as district manager, St Thomas, Ontario.

Duanne R Lamiman has been named district sales manager of the New York office of US Gauge, Div of American Machine & Metals, Inc. For the past seven years he has been serving as sales rept in the company's Cleveland office.

A F Wiest has been placed in charge of all manufacturing operations of Carpenter Steel Co's Alloy Tube Div. Mr Wiest joined the company in 1929.

L R Fletcher has been named sales manager of the new Welding Steels Div of Pyramid Steel Co. Prior to his appointment he was associated with Continental Asbestos & Refining Co as sales manager.

Harry F Devens and **Edward W Sherman** have been appointed assistant sales managers of the Metals Div of Olin Industries. Mr Sherman's headquarters will be in New Haven, Conn, and Mr. Devens' in East Alton, Ill.

Harry I Dixon has been appointed New England rept of Alloy Precision Castings Co. Mr Dixon formerly served as vice president of Sterling Alloys Co.

Herbert G Speck, new factory manager, and **Emery J Szabo,** new chief engineer, head a roster of new executive appointments for Leece-Neville Co. Others: **Charles M Heston,** to superintendent of the King St, Cleveland, plant; **Edward J Siegwarth,** to superintendent of the small motor plant; **Joseph J Ribar,** to inventory control manager; **Paul E Lewis,** to assistant chief engineer; **Elmer P Orvis,** to development engineer; and **Joseph Poticny,** to product engineer.

MEASURE IN MICROINCHES RMS

AIRCRAFT FUEL PUMP LINERS

Live Longer

because Thompson Products, Inc. *uses* the PROFILOMETER

Thompson Products, Inc., of Cleveland, Ohio, in production of high precision parts for both the automotive and aircraft field has found the Profilometer an important shop tool in regulating quality and increasing production of accurately machined and ground parts.

A specific example is Thompson production of liners for aircraft fuel pumps. Extreme surface accuracy in making these high precision liners is of prime importance.

Due to the close clearance of rotor blades within the liner, surface roughness measurement of the I.D. must be held to a maximum of 12 microinches!

Thompson finds that a fast, positive I.D. surface roughness measurement, made by the Profilometer after liners are ground, gives an accurate check of desired quality without guesswork. Result—assured precision giving longer life to liners when used in aircraft engine fuel pumps.

To be *sure* of precision surface roughness measurement, plants throughout the world are relying upon the Profilometer today. In your production and inspection departments you also can obtain the exceptional advantages of the Profilometer as an important shop tool.

To learn more about the Profilometer, write today for this free bulletin—"How to Specify Surface Roughness and Why."

Profilometer is a registered trade name.

MICROMETRICAL MANUFACTURING COMPANY

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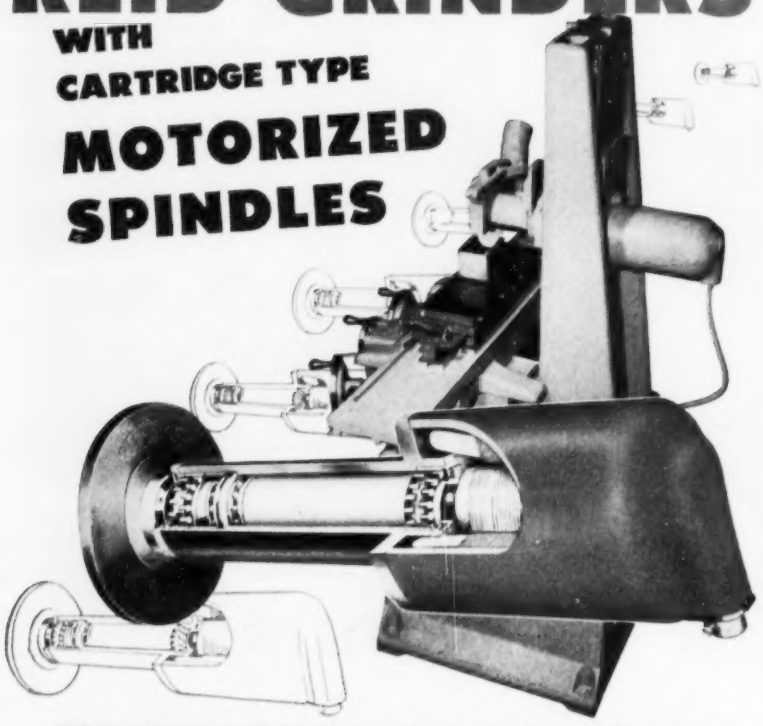
PRECISION
IS BUILT INTO
REID GRINDERS
WITH
CARTRIDGE TYPE
MOTORIZED SPINDLES



When tolerances call for plus or minus a ten thousandth, you can rely on a Reid Precision Surface Grinder. Every Reid is equipped with a precision spindle, running on pre-loaded roller bearings and dynamically balanced to revolve with exact accuracy at peak loads. Sealed-in lubrication of bearings and motor *keeps* these spindles performing with a minimum of attention, year after year.

- Standard-size, interchangeable within minutes
- Wheel guard with hinged cover allows quick wheel change
- Adjustable dust guard spout to suit thickness of work being ground
- Extra rigidity eliminates chatter — increases production
- Sealed-in lubrication protects bearings from dust and dirt — reduces friction for cool running
- For jobs requiring the spindle in vertical position, a special bracket, furnished by Reid, is all that is necessary for conversion

Cartridge type motorized spindles with 3" diameter quills, as manufactured by: Pope, Ex-Cell-O, Whitnon and Parker may be used with Reid Grinders.

Reid Precision Grinders (the result of 53 years of experience) will improve the quality and capacity of *your* shop. Find out why Reid is the choice of industry for precision grinding. Write for Bulletin 618-1.

Reid Brothers Company, Inc.

BEVERLY, MASSACHUSETTS

Harry B Hubbard has been named direct factory representative in Connecticut for Hy-Pro Tool Co of New Bedford, Mass. Mr Hubbard was formerly with American Hardware Corp, and served as a lieutenant colonel in charge of Bradley Field purchasing.

Richard H Oberholtzer has been appointed manager of Kennametal Inc's Milwaukee district to succeed **Carl Wheelock,** resigning after six teen years with the organization. Mr Oberholtzer, who joined the firm in 1946, was with Kennametal's in the Detroit office prior to assuming his new duties May 1.

C O Helphenstine has been named district manager for the Detroit area of British Industries Corp. Mr Helphenstine was formerly associated with the Chrysler Corp, Briggs Mfg Co, and J Lee Hackett.

F S Cornell, who will continue to manage A O Smith Corp's Permaglas-Heating Div, has been appointed executive assistant to the president of A O Smith. In the absence of Mr Cornell, who will make his headquarters at A O Smith's main plant in Milwaukee, the Kankakee operation will be administered by a four-man committee.

Frank D Wallace has been appointed chief engineer of Magna Mill Products, South Gate, Calif, precision machine shop. He was formerly tool engineer for Douglas Aircraft Corp for 10 years.

R L Wells has been appointed assistant manager of engineering, and **P G DeHuff** manager of engine design for Westinghouse Electric Corp's Aviation Gas Turbine Division, South Philadelphia, Pa. Mr Wells was formerly manager of engine design for the Division. Mr DeHuff has been in the Division's metallurgical engineering section.

Philip Watson has been appointed manager of P R Mallory & Co's Welding Division, Indianapolis, succeeding **William Fetter,** who now heads Mallory's Switch Division. **David Smith** has been named head of Welding Division sales.

Edward O Hascall has been appointed director of purchasing for Ainsworth Mfg Corp, Detroit, succeeding **C L Miller**, who is retiring but will remain on Ainsworth's staff as a consultant.

Let an Expert solve your Cutting Oil Problem . . .

Hundreds of machine shops, large and small, have eliminated the *chance of error* in selecting the correct cutting fluids for their varied operations.

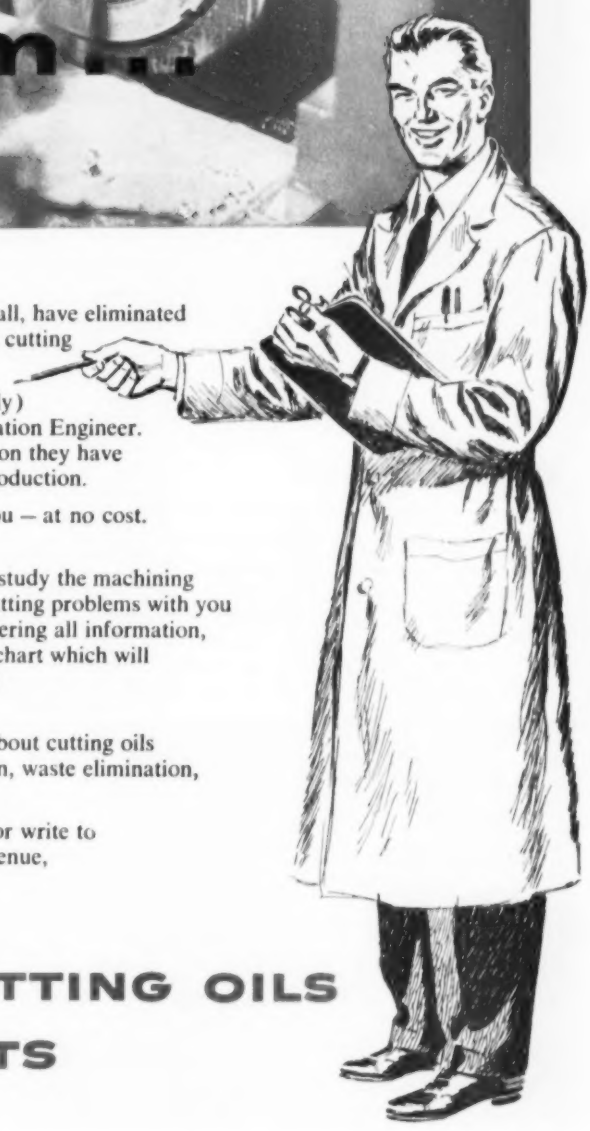
They solved this common (and often costly) problem with the help of a Sinclair Lubrication Engineer. And by using the right oil for each operation they have improved work quality and stepped up production.

The same expert service is available to you – at no cost. Here's how it works.

Call in a Sinclair Lubrication Engineer to study the machining operations in your shop. He will discuss cutting problems with you and your production personnel. After gathering all information, he will prepare a comprehensive, detailed chart which will guide you quickly to the correct cutting oil for any particular operation.

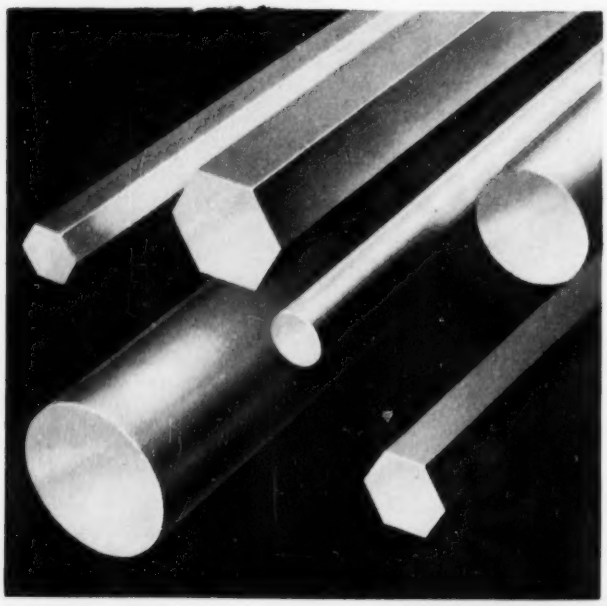
In addition, he will brief your personnel about cutting oils and coolants – storage, mixing, application, waste elimination, sanitation, etc.

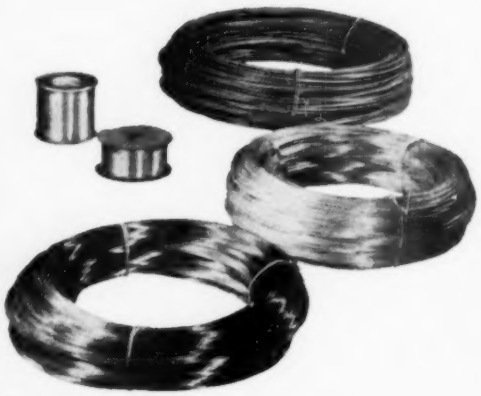
Phone your local Sinclair Representative or write to Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.



SINCLAIR CUTTING OILS and COOLANTS

KAISER ALUMINUM PRODUCTS



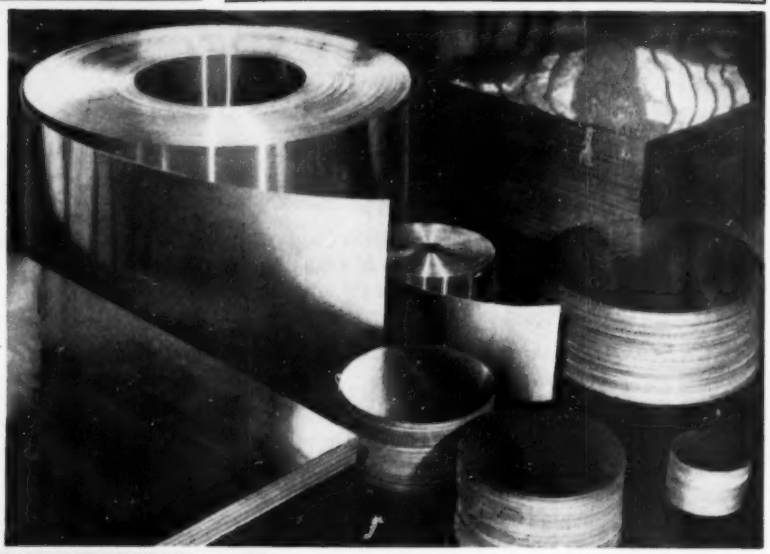


Wire

Supplied as round drawn wire, hexagonal wire, rivet wire, welding wire, screen wire, EC wire, redraw wire.

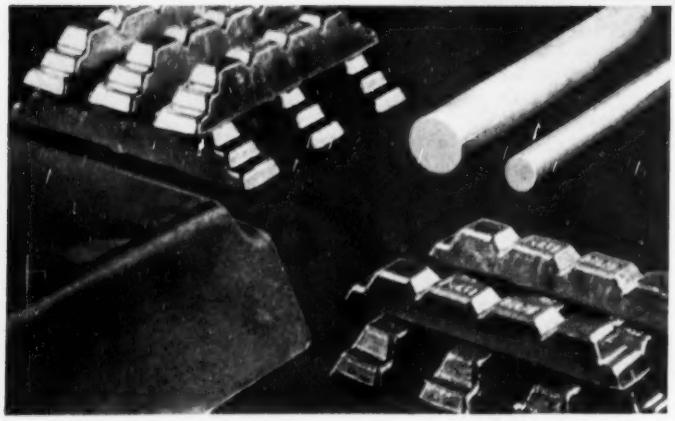
Rod and Bar

Available in a wide range of alloys in rolled and cold finished rod and bar, round and hexagonal standard screw machine stock, hexagonal bar, redraw rod, rivet rod and round forging stock.



Sheet and Plate

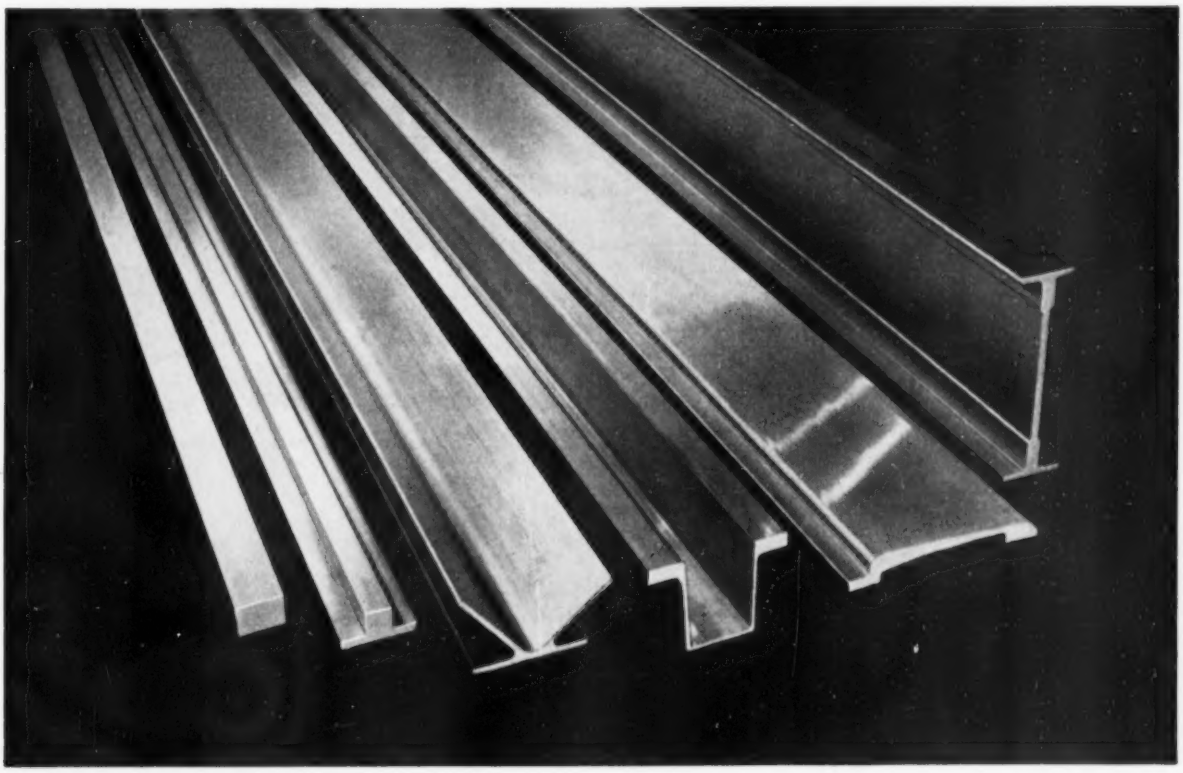
Supplied as flat sheet, plate, coil sheet, circles in a complete range of alloys, sizes and tempers. Specialty sheets also produced to fill volume requirements.



Pig, Ingot and Billets

Kaiser Aluminum produces Pig, Ingot and Extrusion Billets in a range of alloys and sizes to meet your specific requirements.

for you...the nation's fabricators



Extruded Shapes to meet your specifications

Available in solid, rod, bar, semi-hollow and hollow shapes in all standard alloys. Also available in tubing. In addition, Kaiser Aluminum provides the services of its engineers to work closely with you to select proper alloys or to help improve production methods.

To SUPPLY you and thousands of other fabricators with aluminum in the forms in which it can be used most economically, Kaiser Aluminum produces a broad line of basic and semi-finished mill products.

More than 85 per cent of Kaiser Aluminum's total production is sold in the form of these mill products for fabrication by customers. It's the highest percentage in the industry.

Kaiser Aluminum has earned an unsurpassed reputation for promptness, dependability, and helpful service in providing these products.

Included among Kaiser Aluminum service facilities are: metallurgical research, development and engineering—all invaluable sources of experienced assistance and technical data to users of Kaiser Aluminum.

For complete information, call or write any Kaiser Aluminum sales office. Located in principal cities. See our catalog in Sweet's Product Design File or write for copy. Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, California.

Other Kaiser Aluminum products include: Industrial Foil, and electrical conductor. Kaiser Aluminum also supplies household, freezer and broiler foil for home uses, Shade Screening for the building industry and corrugated Roofing Sheet for farm and industrial buildings.

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setting the pace—in growth, quality and service

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V-LINER (PATENTED) INSPECTION UNIT

A new, universal inspection device which integrates all of the normal requirements of the Inspection Department

Saves

space, man-hours, tool investment.

BASIC UNIT INCLUDES: (1) a 60" surface plate; (2) an exclusive, concentricity checking attachment; (3) adjustable bench centers; (4) V-blocks; (5) sine plate; (6) indicator attachment. All are self-aligning and quickly adjustable or removable. Specifications and tolerances meet finest precision standards. Savings in space, man-hours and tool investment are substantial.

Write for Bulletin V-1

The V-Liner Inspection Unit incorporates, all of the skill, precision and experience gained by Swanson in more than a third of a century of designing and building special automatic machines. Swanson machines have reduced costs, increased output and improved precision in hundreds of manufacturing operations.

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Memory Devices for Automatic Machines
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TOOL & MACHINE PRODUCTS INC., ERIE, PA.

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GREAVES NO.2-H

Plain or Universal

- **Offers every modern milling machine advantage:** 18 spindle speeds 25 to 1250 rpm, 18 feeds ½" to 30" per minute, rapid traverse, Timken bearings and many others.

You can't buy a better combination of simplicity, rugged construction, ease of operation, accuracy and production speed.

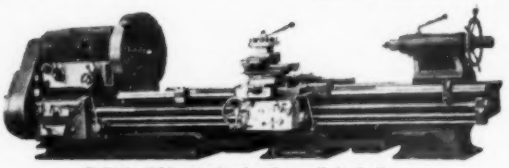
Send for bulletin and price list.

GREAVES

THE GREAVES MACHINE TOOL CO.
2005 Eastern Avenue, Cincinnati 2, Ohio

NEW VDF HEAVY-DUTY LATHE

30¼" swing **Turning length 22'11"**



Built to USA standards—Immediate Delivery

Maximum weight of work 6 tons. 24 Roughing and 12 Finishing spindle speeds. 30 H.P. A.C. base motor. Designed for standard American voltages and frequencies; calibrations and lead screws in inches. Attractive price. *Write for complete details.*

KURT ORBAN COMPANY, INC.
205 East 42nd Street, New York 17, N. Y.

KAUFMAN TAPPING MACHINES

BUILT FOR SPECIFIC PRODUCTION JOBS

Kaufman *specializes* in tapping machines—every machine precision-built to meet the requirements of individual production jobs. Designed with fully automatic cycle, single or multiple spindle heads and other most advanced features.

Write for complete information

KAUFMAN MFG. CO.
MANITOWOC, WISCONSIN

"...and that is our Gear Department"

WE DOUBT that the photo of our plant hangs on many of our customers' walls. But we *do* serve as the "gear department" for many companies with both small and large gear requirements.

The benefits these customers enjoy might interest you. Working closely with you, all our facilities and personnel are at your service—trouble-shooting, designing, specifying, engineering, and manufacturing gears to meet your needs exactly. And behind these functions is the experience we have gained through almost forty years devoted exclusively to gear manufacture.

Of course, we sell to many manufacturers who make a portion of their own gear requirements, and shall always continue to do so. But for many companies, and perhaps yours is one, much may be gained by examining case histories of customers who refer to our company as their "gear department."

* * *

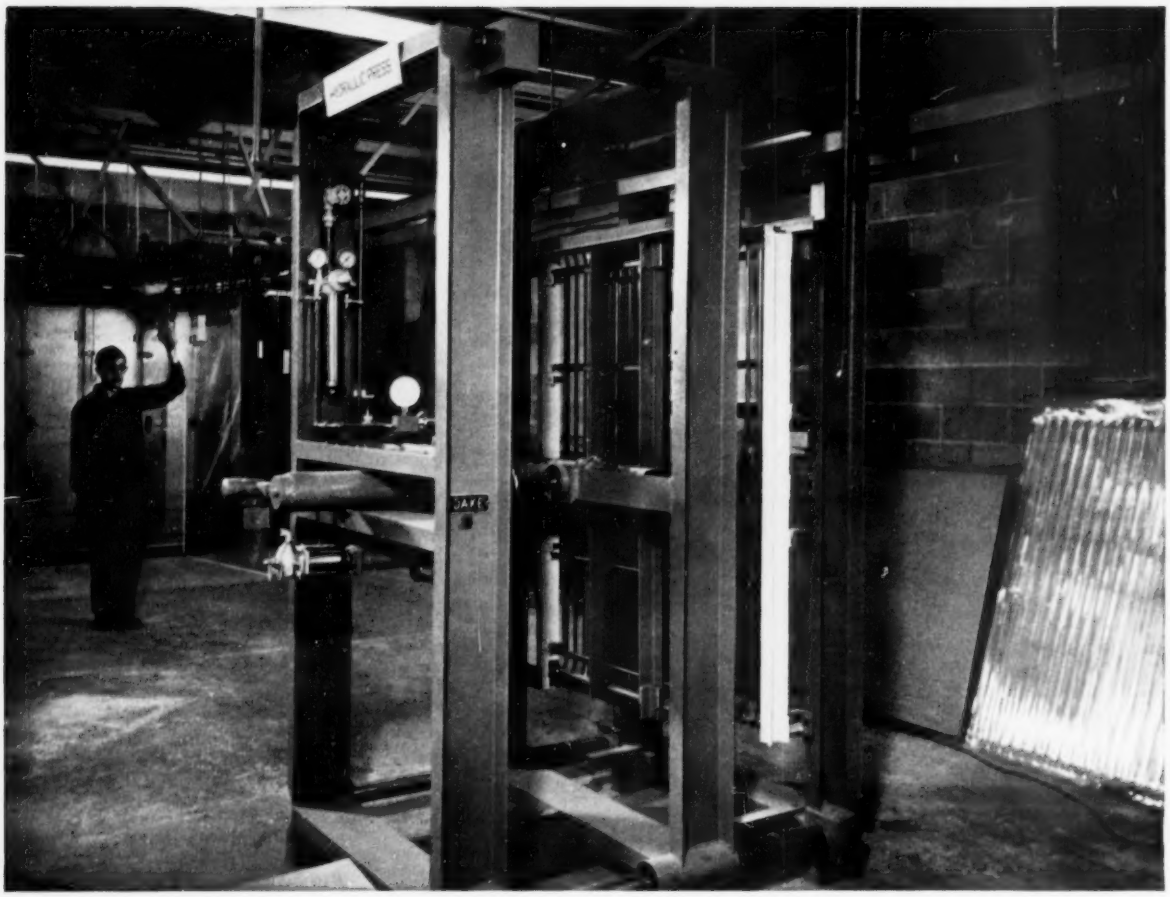
Write for our comprehensive catalog containing full information on the ten gear types in which we specialize.

AUTOMOTIVE GEAR WORKS, INC.

RICHMOND, INDIANA

DOUBLE DIAMOND GEARS

FOR FARM EQUIPMENT, AUTOMOTIVE & GENERAL INDUSTRIAL APPLICATIONS



DAKE Custom Engineering saved $35,000 for this manufacturer on a special 34"x60"-bed press

In manufacturing bath enclosures it was necessary to put half-inch deep corrugations in large (34"x60") sheets of plexiglass. The forming had to be done quickly after the sheets had been softened in an oven.

Most suppliers approached about a press with bed large enough for 34"x60" sheets quoted in terms of a $40,000 to $50,000 investment. Then the manufacturer happily learned about Dake.

After placing his problem before Dake engineers, the result was the custom-engineered hydraulic press shown above . . . designed, fabricated and installed for less than 10% of what other manufacturers had quoted.

If you suspect that some of your production operations might be simplified with a custom-engineered press, it will pay *you* to consult Dake, too.

Dake Engine Company, 636 Seventh St., Grand Haven, Mich.

DAKE PRESSES

Arbor Presses

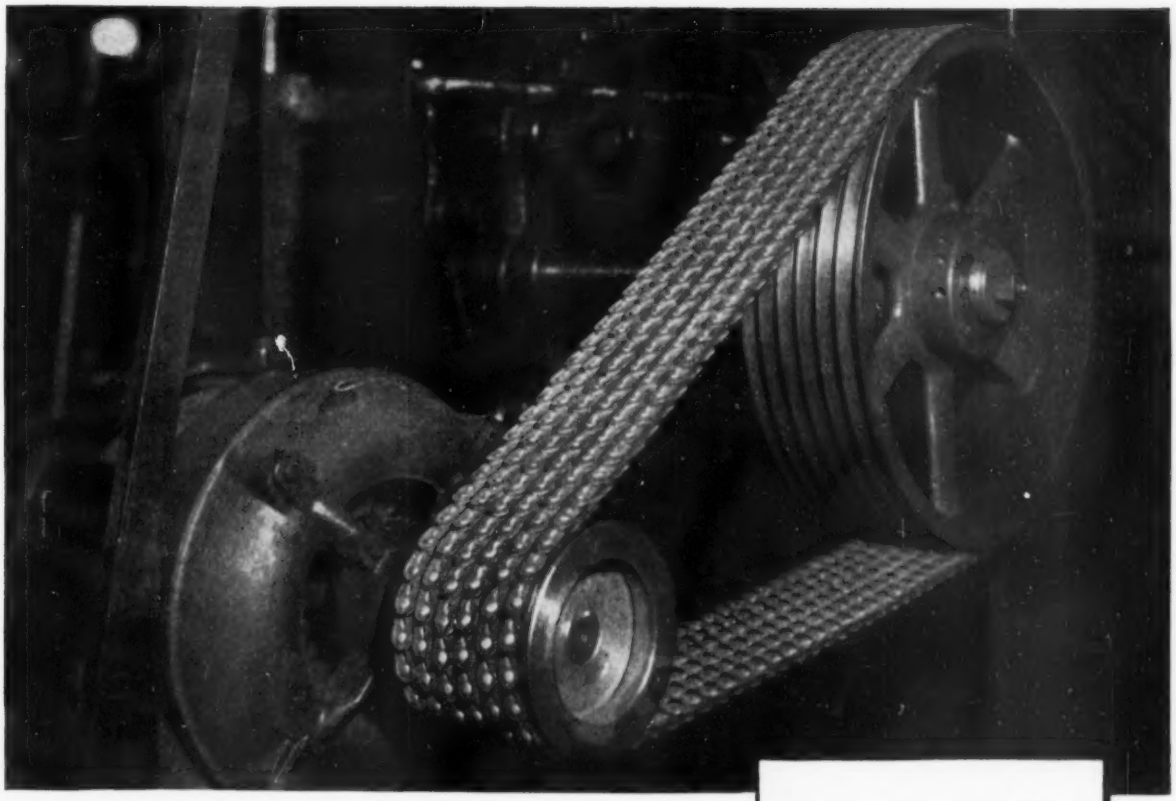
Hand-Operated Hydraulic

Power-Operated Hydraulic

Guided Platen

Gap Type Presses

Movable Frame



with Veelos on your machines...

v-belt adjustment is a production-saving job

All v-belts stretch—but with endless v-belts there's nothing you can do to take up this stretch once the motor has been completely "run-out". With Veelos it's another story! The adjustment is in the belt itself—even sliding motor bases are unnecessary.

Changing the length of each Veelos v-belt by just adding or removing links is the best, most efficient, way to keep the belts correctly matched. Using Veelos means that the job of adjustment is done easily and quickly . . . at a fraction of the cost of replacing with new belts.

Veelos, the adjustable v-belt, provides vibrationless, full power delivery. It is easier to stock and control because it is packaged on 100-foot reels in every standard width. And Veelos can be adjusted or made up in correctly matched sets with the least amount of machine down-time—at production-saving speed!

Have you seen this Veelos Facts Book?

Your Veelos v-belt distributor's salesman will be glad to give you a quick trip through this fact-packed, 36 page book. You'll find it well worth the few minutes it takes. Next time the salesman calls, ask him to show it to you.

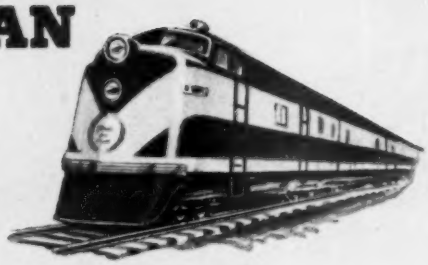
VEELOS
THE LINK
V-BELT

Write today for your copy of the Veelos Data Book—it is a completely illustrated, 28-page catalog that gives file-worthy product and engineering facts which you should have handy. We'll be glad to send you a copy at once.

MANHEIM MANUFACTURING AND BELTING COMPANY
601 Manbel Street, Manheim, Penna.

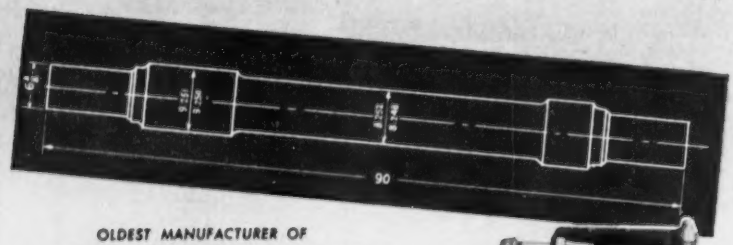
ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Turchan and AMERICAN provide the answer to lower costs in railroad shops



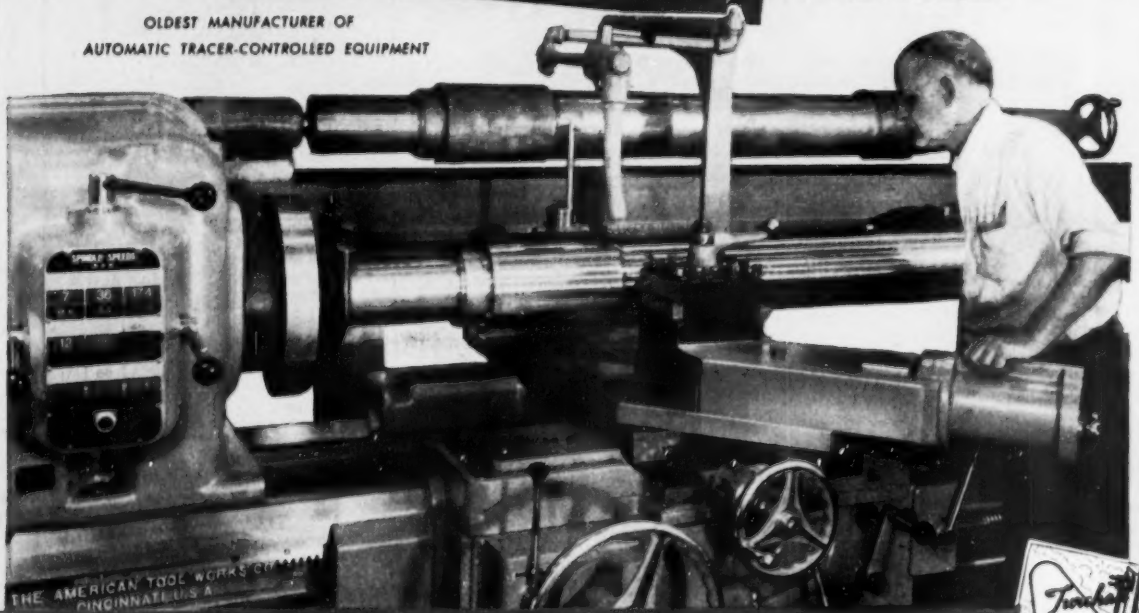
Only 1½ hours... instead of 8 hours to completely finish turn this Diesel axle

Six and one-half hours saved in machining this locomotive axle from the rough forging—a typical example of spectacular time savings being realized in many up-to-date railroad shops. The 25" American Lathe on which this job was done is equipped with Turchan Tracer-Controlled Hydraulic Duplicating equipment. This combination provides automation that requires no highly skilled help, no costly form tools, maintains close tolerances at increased speeds, minimum job handling. Net result: a new era in production efficiency for any metalworking plant.



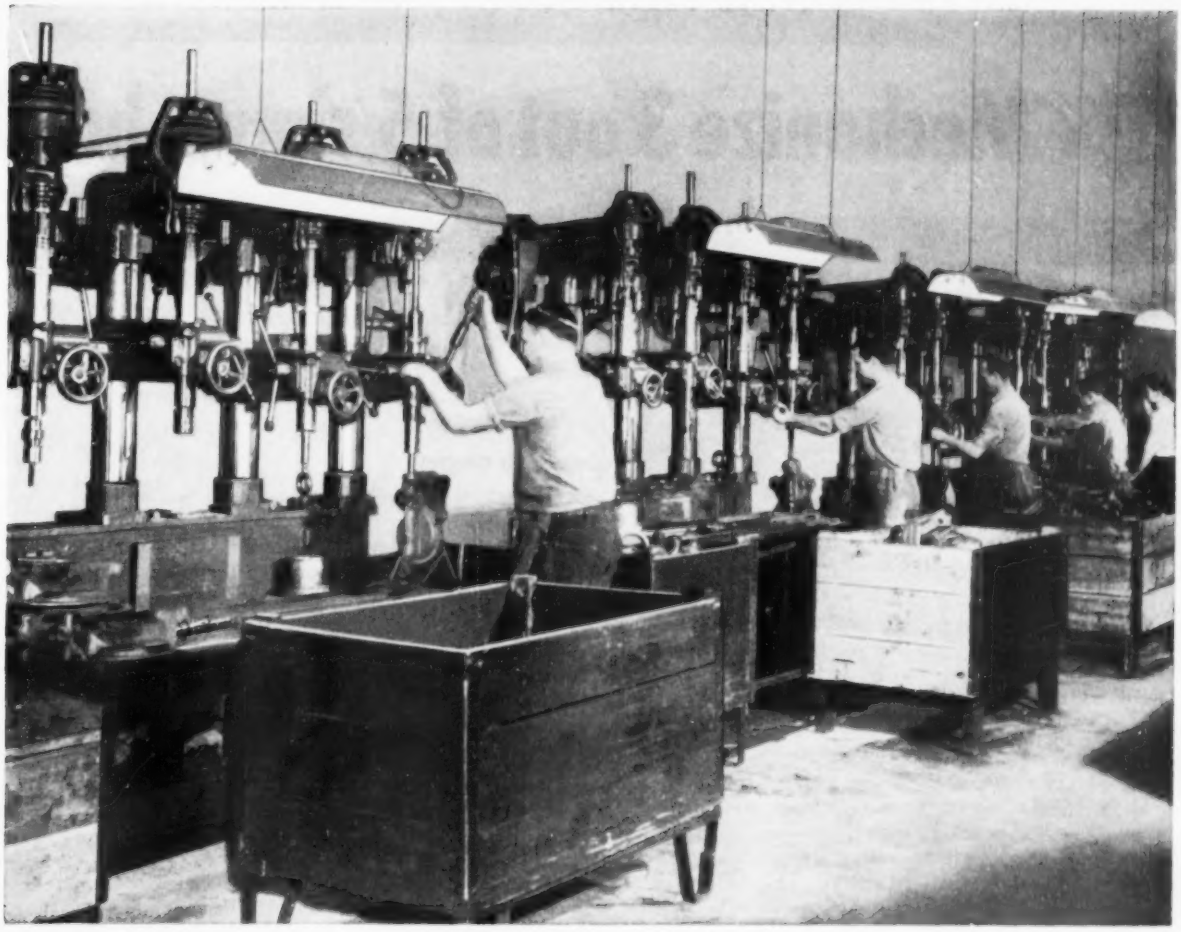
Automatize now—with Turchan! Produce better work, faster, at lower cost. There is Turchan automatic tracer control equipment for any make or size of standard or special machine tools. Overcome your shortage in skilled manpower — send sketch and specifications of any job for an estimate. No obligation.

OLDEST MANUFACTURER OF
AUTOMATIC TRACER-CONTROLLED EQUIPMENT



TURCHAN FOLLOWER MACHINE CO.
8259 LIVERNOIS AVENUE • • • DETROIT 4, MICHIGAN

Write for Bulletin
Tells how your present machines can go automatic, handling intricate work faster at lower cost.



EASY WAY TO HIT PEAK PRODUCTION!

In this well-known meter plant, as in hundreds of efficient shops, they're jacking up drilling output this simple way: install the easy-handling multiple spindle "Buffalo" Drills your operation requires. You not only eliminate waste setup motions, but you get better accuracy, less worker fatigue and longer drill life.

In the photo above, the men on the four-spindle "Buffalo" No. 22 Drills are able to set up as many as four differe ¤ drilling, tapping and reaming operations. Production flows right down the line easily and with minimum delays between operations. All controls and adjustment cranks are easily reached, so that these large-capacity machines are as easy to handle as smaller sensitive drills. Let us recommend a drilling arrangement to help cut *your* drilling time and cost!

MULTIPLE SPINDLE "Buffalo" No. 22 DRILLS

DIAMOND JUBILEE 75TH ANNIVERSARY

"Buffalo" MACHINE TOOLS

BUFFALO FORGE COMPANY

509 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING PUNCHING SHEARING CUTTING BENDING

Mechanize 3 out of 5 sigma* hand

You can mechanize a lot of your manual sigma* welding applications with LINDE's new, lightweight SWM-3 machine. One man handles this easily portable machine—it weighs only 40 lbs.—and it's flexible. It can be mounted on a wall, a post, a carriage, or on a tractor-type machine, depending on the work at hand . . . And best of all, this machine can "think"—through LINDE's electronic voltage control.

Arc voltage control is a LINDE development for machine sigma welding. Set up out of the way, the voltage control instantaneously speeds up or slows down wire feed speed as required by changing arc conditions. The result is that you get smooth, uniform welds through proper control of welding variables.

LINDE'S ELECTRONIC VOLTAGE CONTROL

How many of *your* welding problems are due to a fluctuating voltage? How many? Well, you can eliminate them *all* with LINDE's electronic voltage control. It holds welding voltage substantially constant at any preset value within the welding range. It responds to increases or decreases in arc voltage by speeding up or slowing down the wire feed motor. This action is practically instantaneous and constant arc voltage results.

The voltage control unit is mounted either locally or remote from the machine. Set up near the welding generator or transformer, it makes the welding head (rod drive and wire reel section) small and compact—easy to handle.

One Knob Control

After making several basic adjustments that set the SWM-3 for a specific job, the machine practically works by itself. Just throw the switch to start welding. It's as easy as that. One simple knob is all you turn.

Quick, Easy Starts

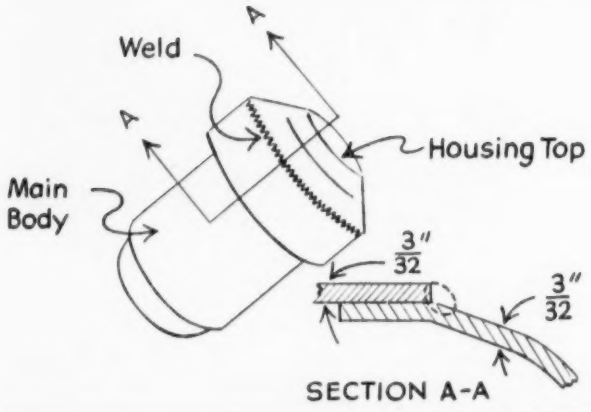
Use the retract starter built into the voltage control . . . turn on the wire feed switch, and the retract starter automatically causes the wire to:

1. feed down until it touches the work,
2. retract from the work, drawing an arc, and
3. start feeding down again, maintaining the preset welding arc voltage.

Ample Power

Because of a high operating voltage built right into the control, the wire feed motor gets ample power for smooth, efficient operation.

A Typical Application



LINDE's SWM-3 welds most metals fabricated commercially—aluminum alloys, stainless steel, carbon steel, deoxidized copper, Everdur, and aluminum bronze. Butt, lap, fillet, or corner welds are made in these metals from 16 gauge thickness upward.

This steel compressor housing is now being fabricated with LINDE's new SWM-3 machine for sigma welding. Lap welds in the 3/32-in. material are made at 55 in. per minute. Current is 380 amp. dcrp, using 3/32-in. welding wire.

* Initial letters of *Shielded Inert Gas Metal Arc*. "Sigma" is easier to say.

welding jobs with this little machine with the big brain

HERE'S ALL YOU NEED RIGHT AT THE WORK

Welding Head

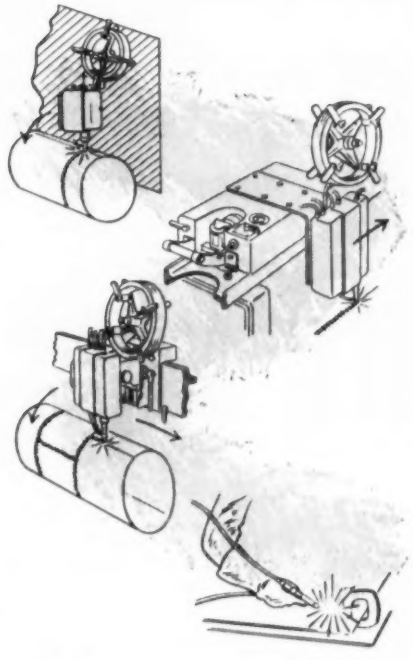
Net Weight . . . . . 40 lbs.

It houses . . . . . wire drive, wire-straightening device, water-cooled cup, wire guide tube and holder

It handles . . . . . 1/32, 3/64, 1/16, 3/32, welding wires

LINDE's *dependable electronic voltage control unit.*

LINDE'S SWM-3 IS FLEXIBLE



USE IT IN A STATIONARY POSITION

Set up the welding head on a wall, post, or vertical bracket . . . Move the work to be welded beneath it. You can use the SWM-3 for many jobs in this position—it will handle four different sizes of welding wire.

GIVE IT MOTION

Mount the welding head on the OXWELD CM-37 tractor-type machine carriage . . . The SWM-3 will make longitudinal welds in cylinders, or butt, lap, and fillet welds in aluminum and stainless or carbon steels.

COMBINE BOTH SETUPS

It's just as easy to mount the SWM-3 on the OXWELD OM-48 side beam carriage: Use it for making longitudinal welds in any part. Stop the unit, revolve the work, and you can make circumferential welds in the same part—*without changing the setup.*

OR, USE IT MANUALLY

By adding an adaptor, you can use the SWM-3 with your sigma hand welding torch. It becomes a flexible drive unit to help you handle all of your other jobs that do not lend themselves to mechanization.

Ask LINDE to tell you more about the SWM-3 . . . There's a good chance that it will help you do one of your present welding jobs better, easier, faster, and cheaper. Telephone or write the nearest LINDE office today.

LINDE AIR PRODUCTS COMPANY

A Division of Union Carbide and Carbon Corporation

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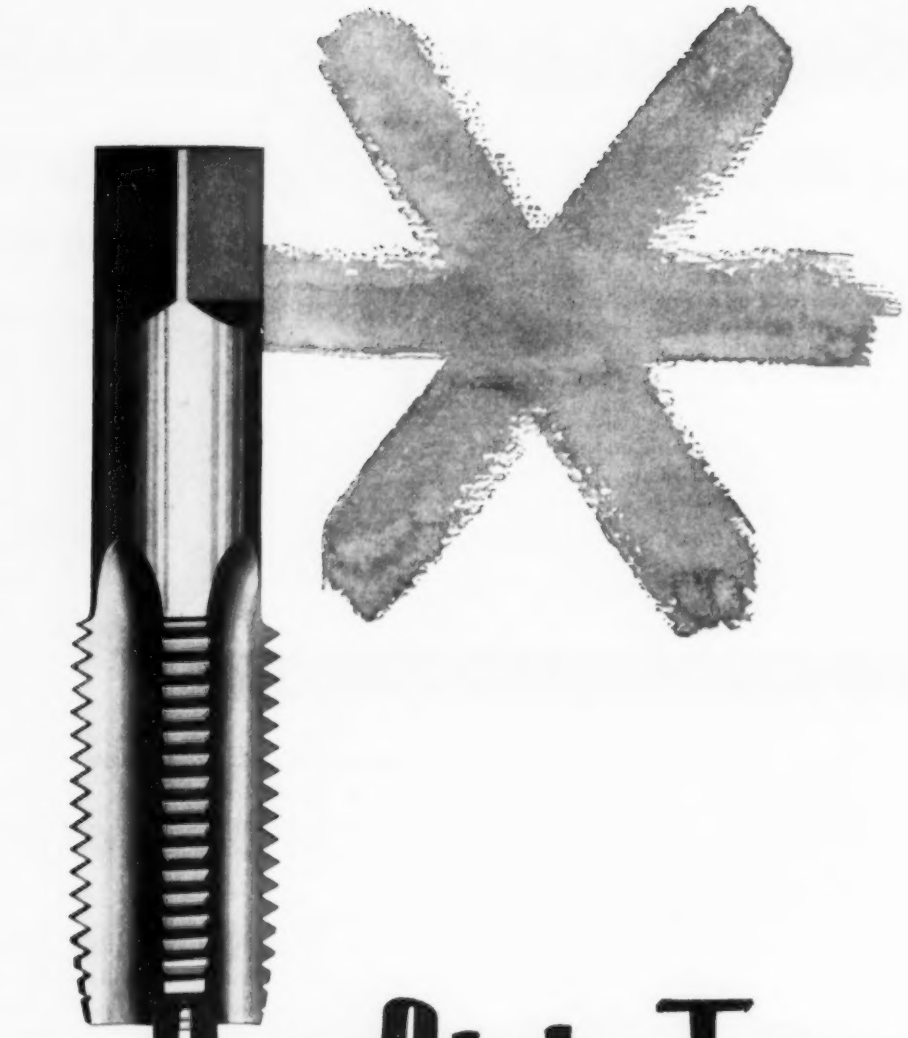

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Tool Steel Topics

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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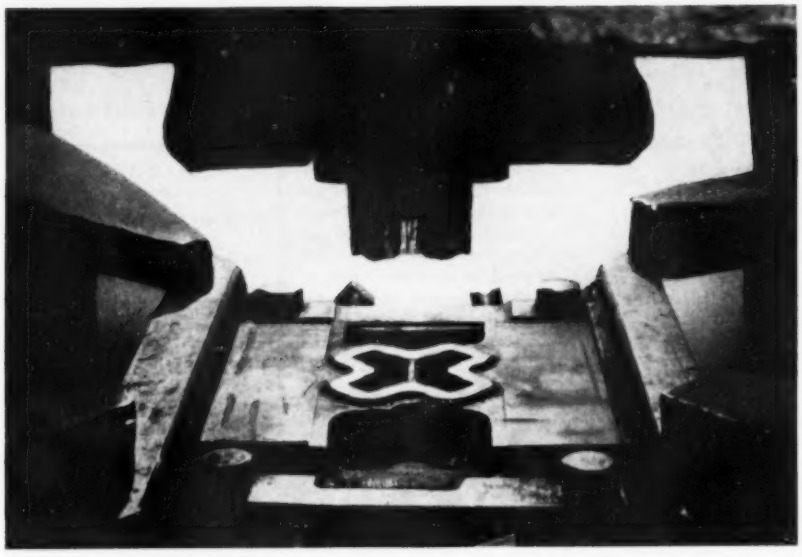


In the center is the four-piece, composite trimmer die used in one of the service tests on Lehigh H tool steel. In the cold-trimming of 20,000 drop forgings, the two die components hardened by the high-temperature, "short-cut" method showed only one-half as much wear as the other two die components heat-treated in the usual way.

"SHORT-CUT" Hardening Improves Wear of High-Carbon, High-Chrome Steels

Production men often lose patience, even tear out their hair, while waiting the many long hours necessary for the heat-treatment of tools and dies made from the high-carbon, high-chromium tool steels. When treating large dies, for example, it's not unusual to have a pack-hardening cycle of 24 hours or even longer. But until lately there's been no short-cut that doesn't result in improperly treated tools.

Faster Treatment

That's why we're happy to report that our research men are developing a much faster method of heat-treatment — one that not only promises to save valuable time, but also imparts better wear-resistance than the usual heat-treatment for high-carbon, high-chromium steels.

It's a high-temperature treatment that does the trick. Ordinarily these grades are hardened by a long soak at 1850 F, followed by air-quenching. The new treatment involves a much shorter soak at about 2100 F. By no means perfected as yet, this new wrinkle was developed in a series of experiments in which the dies hardened at 2100 F were used in actual production work along with similar dies hardened at 1850 F.

Longer Wear

Dies used for cold-trimming drop forgings, for example, were hardened by both methods. These were composite dies, each made up of four assembled sections. Operating conditions were exactly the same. Careful measurements were made at regular intervals to determine the amount of wear between the cutting edges opposite each other. After trimming 20,000 forgings, the wear of the die edges was .012 in. on the pair of trimmer-die components treated by conventional methods; on the dies hardened by the high-temperature cycle the wear amounted to only .006 in. — just half as much.

Data Now Available

Tests are continuing. If you'd like to have the details of our work to date, drop us a line at Bethlehem, Pa. Address your request to Room 1037A, Publications Department, Bethlehem Steel Co.

BETHLEHEM TOOL STEEL ENGINEER SAYS:

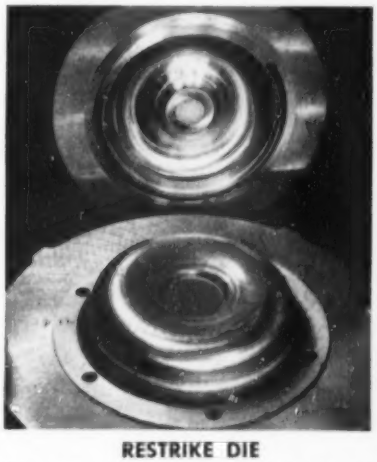
Here are five fundamentals of successful toolmaking.

It's always a challenge for toolmakers to produce tools or dies which will be both hard enough to stand up in service and ductile enough not to crack, either in the making or in use. To get the necessary ductility, most tools are hardened below the maximum obtainable.

Once the proper balance between hardness and ductility has been determined in service, the maintenance of this balance helps to assure good performance. But good tool performance depends on more than that. In fact, there are these five fundamentals which must be considered:

1. Good tool design
2. Sound tool steel, of proper grade
3. Correct heat-treatment
4. Proper grinding
5. Proper application of the tool

These five fundamentals are like links in a chain; a deficiency in any one of these steps, or links, can lead to trouble. Poor tool design, for example, may often result in quenching cracks. Careful attention paid to each of these factors will help you to get the best tool life.



RESTRIKE DIE

This restrike die made of A-H5 tool steel is one of the precision tools used in making parts for torque converters. A-H5 has better wear-resistance than standard oil-hardening steel and holds more accurately to size during heat-treatment. It's a general-purpose, air-hardening grade containing 5 pct chromium, yet it's as economical as most oil-hardening tool steels.

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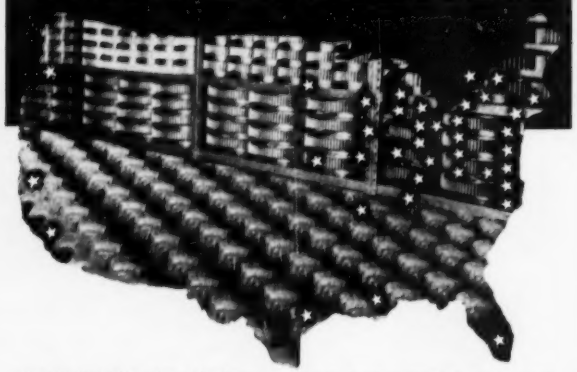

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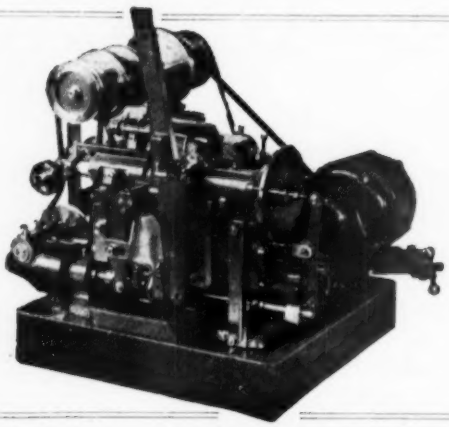

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Aluminum chips are no problem when you follow simple procedures

Knowing the type of chip that each Alcoa alloy produces will simplify your machining. For example, 11S-T3 machines fastest, breaks into small chips. 17S-T4 and 24S-T4 produce tougher chips that require simple practices in tooling and setup to keep the tool zone clear.

On your cutoff, form and box tools, grinding chip grooves and proper rake angles will help control chips. Small rake angles for 11S-T3 produce small chips. Chip grooves, ground with a pencil wheel or the corner of a large wheel, will increase the rake and curl the chip tightly. Drill flutes should be large and polished. In deep-hole drilling, use several drills or back out the drill to clear the chips. Use a large volume of coolant instead of thin, high-speed streams. Direct the flow to wash away the chips and keep the tools and work cool.

Your local Alcoa sales engineer will answer your questions on machining, alloy selection and finishing. You'll find him listed under "Aluminum" in your classified phone book. Aluminum Company of America, 871-E Alcoa Building, Pittsburgh 19, Pa.

ALCOA OFFERS TWO BOOKS *Alcoa Aluminum in Automatic Screw Machines*—a 95-page book containing information on tool design, setup and operating techniques. *Corrected Tool Diameter Tables*—a 64-page book giving corrected tool diameters for circular form tools and flat form tools under conditions of 0°, 5° and 10° top rake.

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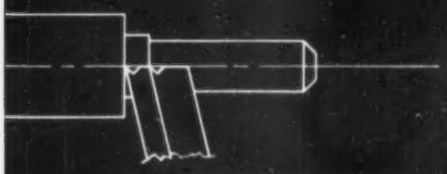
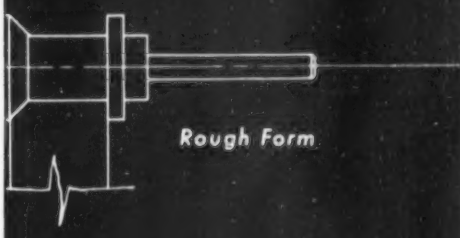
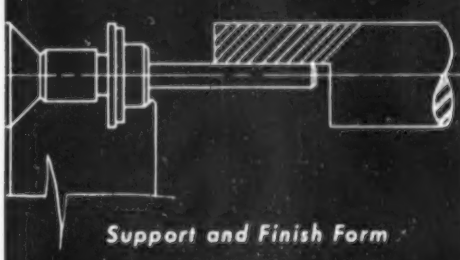


Rough Box

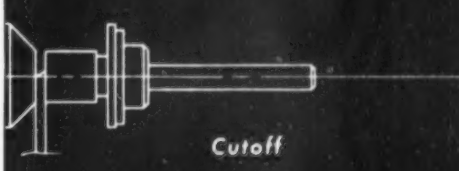
Finish Box



Rough Form



Support and Finish Form



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HANDLE TOUGH JOBS EASILY with ROCKFORD HYDRAULIC SLOTTERS

Rockford Hydraulic Slotters are your easiest method of machining large irregular pieces, internal surfaces, and angular or rotary cuts.

Rockford Slotters sharply reduce cutting time on your cumbersome jobs. Setups are quick and simple. Hydraulic cross, circular and longitudinal feeds give you maximum slotter flexibility. And Hydraulic drive supplies constant speed, simply selected.

Ask a Rockford Machine Tool Co. representative to recommend the Rockford Slotter for your needs.

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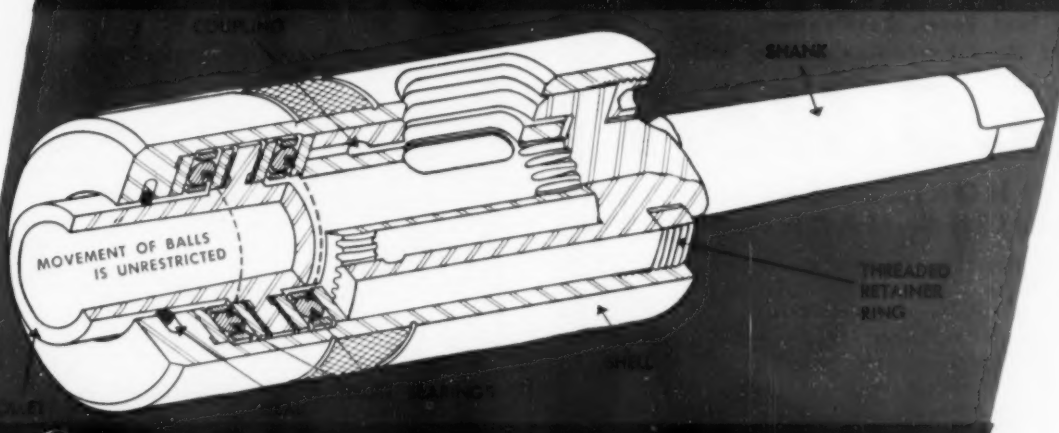

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Clearance in the double-gear spline drive allows free movement of the floating and driving elements. This prevents binding and eliminates "dead" spots or zones which often cause rejects.

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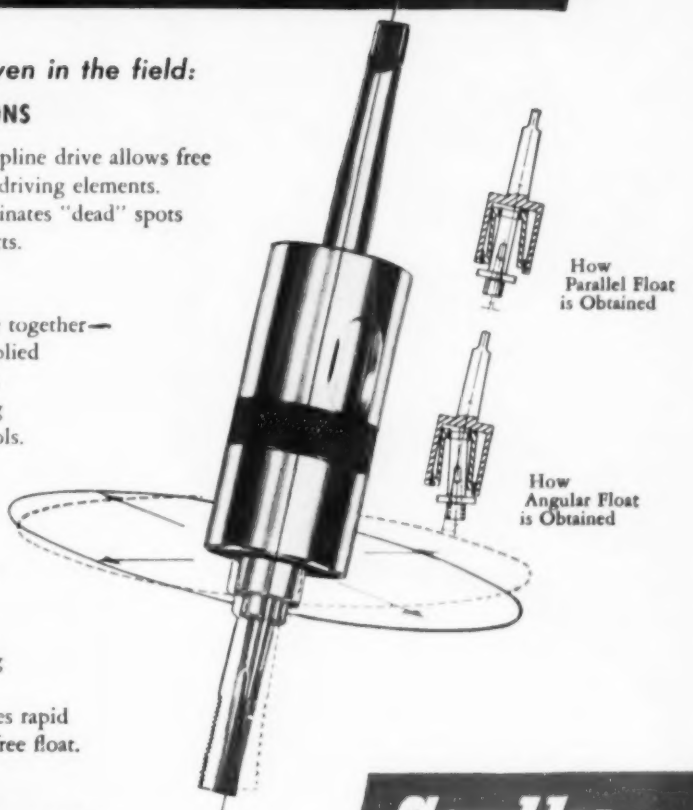
Two thrust bearings—placed close together—minimize the effect of the force applied on the tool by the hole. Thus, tools float freely into alignment—reducing down time and damage to cutting tools.

TROUBLE-FREE OPERATION

Balls are free to move in the required direction or rotate around the collet, because the floating element is separated from the drive. Free movement of the balls eliminates confined reciprocating motion. This greatly reduces the scrubbing action characteristic of small rocking movements. The scrubbing action often causes rapid destruction of ball-thrust plates and prevents free float.



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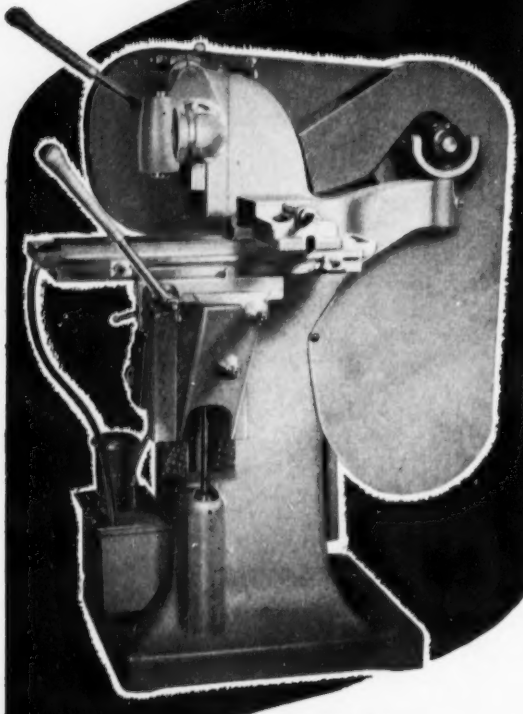

SEND FOR DATA AND SUGGESTIONS

Suggestions as to how a U. S. No. 1 Milling Machine can cut costs on your particular production needs, as well as complete data on the basic machine and attachments, gladly furnished on request.

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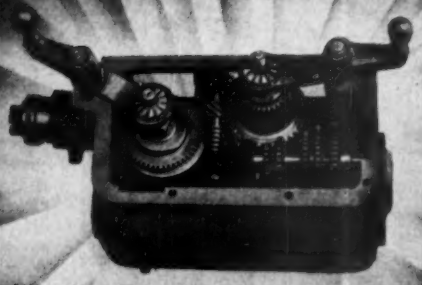

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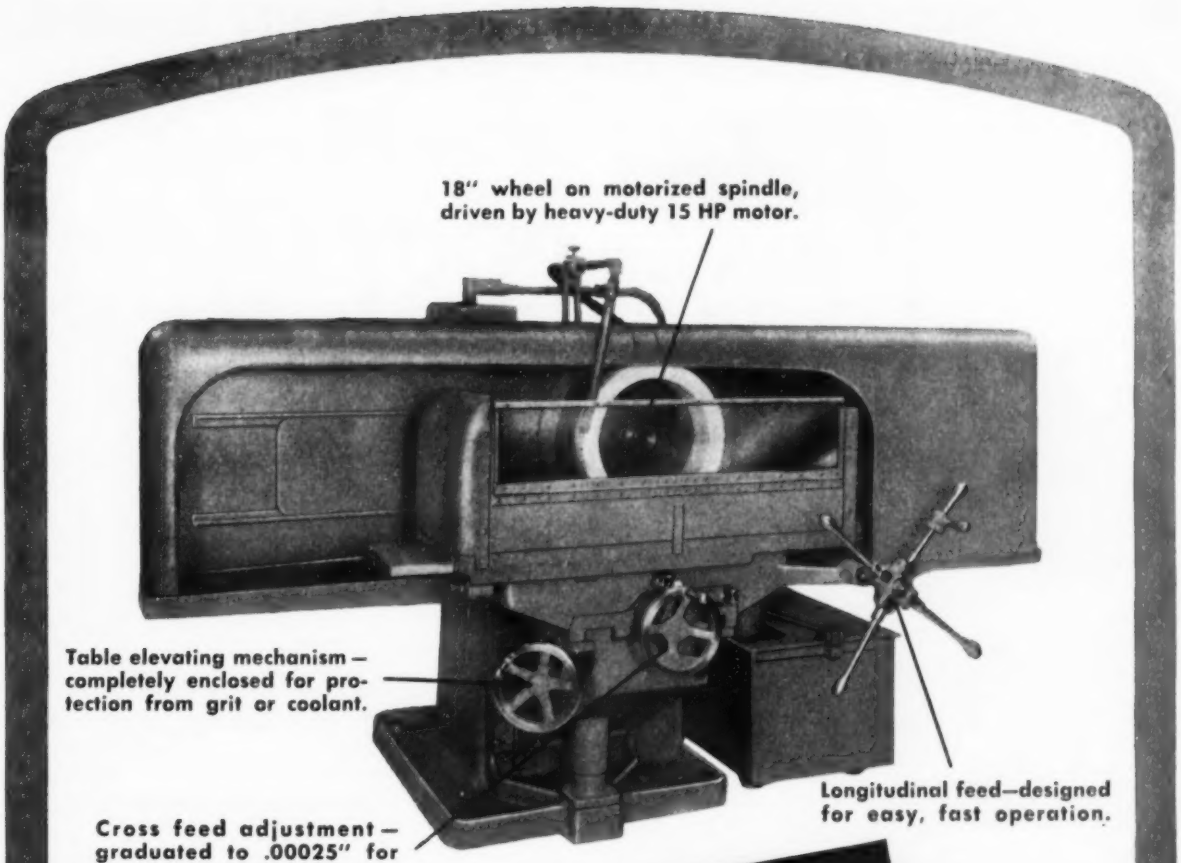
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Table elevating mechanism — completely enclosed for protection from grit or coolant.
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Abrasive 18" Face Grinder has many uses — faces off castings, grinds automobile dies, squares up die blocks, snags castings, does many other jobs where flat, square surfaces are required.

Write for complete details and catalog. Abrasive Machine Tool Company, 8 Dunellen Road, East Providence 14, Rhode Island.

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Maintenance report from user of 13 Rotor Grinders:

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THIS large manufacturer of electrical equipment has been using 13 Rotor B-35 Vertical Air Grinders for 14 months—two shifts per day, 6 days per week—for sanding, wire brushing and grinding. They report that not one cent has been spent for maintenance—no time out for repairs! And metal removal has been far greater than with other types of grinders . . . and their good balance make them popular with operators.

If you haven't seen these new Rotor Vertical Grinders in action, ask for demonstration today!

AIR O'TOOL

ROTOR VERTICAL SPECIFICATIONS

	B-35	B-12
Weight	10¾ lbs.	10 lbs.
Wheel Size	6" Cup	6" Cup
Pad Size	7" or 9"	7" or 9"
Speeds	6000, 5000, 4500, 3500	6000, 5000, 4500, 3500
Height	7½"	7"

For cup wheels, sanding pads, cut off wheels, wire brushing.

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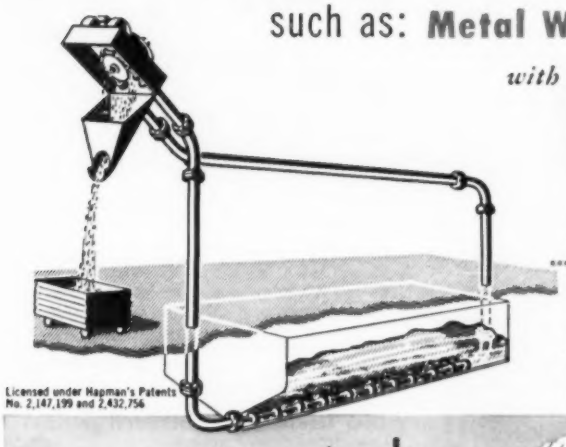

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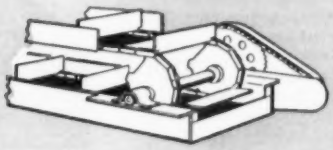
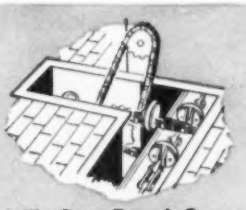
Houdaille Chain Drag Conveyors

Completely enclosed flights and chain automatically collect, transport and discharge chips, sludge, scale and other types of solid or fibrous material which settle to the bottom of tanks or hoppers. Standard pipe sizes — 3", 4", 6", 8". Larger sizes on request. Choice of chains, flights, casings, accessories also available.



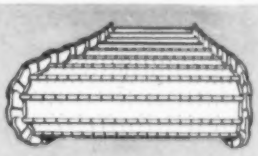
Houdaille Slat Type Conveyors

Slat type trough conveyors, operating individually or in sequence, transport material to any given point—can be operated continuously or intermittently as desired. Slats and chain move material in open troughs, return automatically to collection or transfer points.



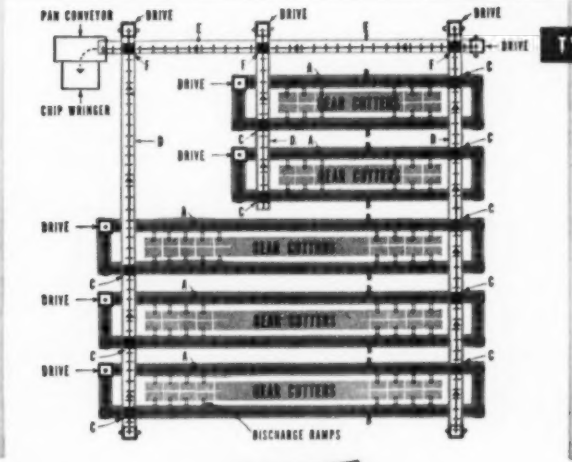
Houdaille Open Trough Conveyors

Chain Drag Conveyors installed in open troughs, running above or below floor level, offer many advantages in different types of operations. Below-floor-level installation, illustrated, continuously removes steel chips from machine tools, keeps system from interfering with heavy traffic plant areas . . . yet offers access to chain and flights at any point of circuit.



Houdaille Pan Type Conveyors

One-piece, heavy-gauge steel plates, featuring all-welded hinge construction, lock together firmly by means of connecting rod to form perfect pan-type conveyor for chips. Welded hinges, rod connections and side wings, securely interlocked even when chain negotiates sprocket or turns, prevent fall-through of material or jamming of conveyor. Plates perforated for drainage, depending on application. Ideal for installation on individual machines or large central chip handling systems.



TYPICAL OPEN TROUGH CHAIN CONVEYOR LAYOUT

Nine 6" Houdaille Open Trough Chain Conveyors operate automatically and continuously to remove steel chips from 500 Gleason Gear Cutters in large automotive plant. Five of the conveyors (A) pick up steel chips deposited into troughs (B) by the gear cutters. Each of the five conveyors services a battery of gear cutters aligned in a double row. Trenches, accommodating the open trough conveyors, wind completely around each double row of gear cutters up one side and down another. Chips empty into the troughs by means of a discharge ramp extending from each gear cutting machine.

Each of the five conveyors discharges chips at two points on their individual circuits (C). Here, three other 6" open trough chain conveyors (D), operating over and under the first five conveyors, collect, transport and ultimately discharge all of the chips into one main 6" open trough chain conveyor (E) at three points (F). At these points the chips are carried along the trough to a pan conveyor which discharges regularly into a chip wringer

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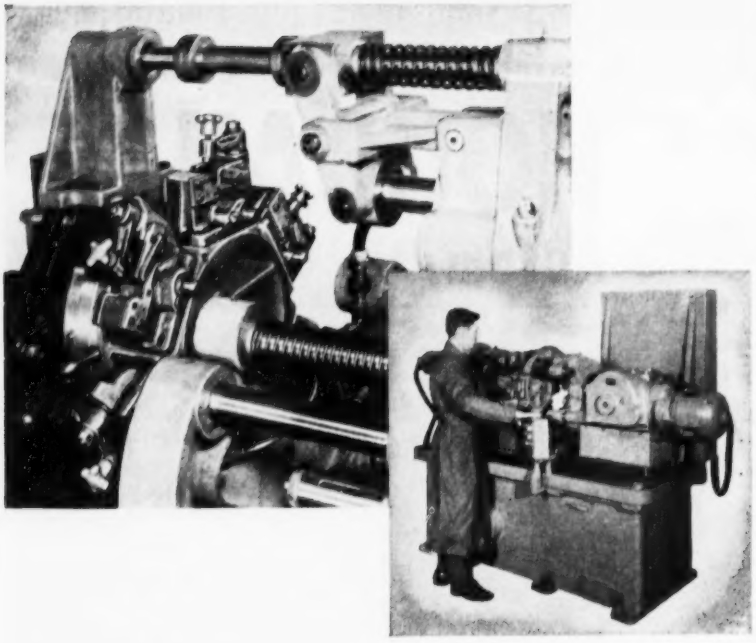

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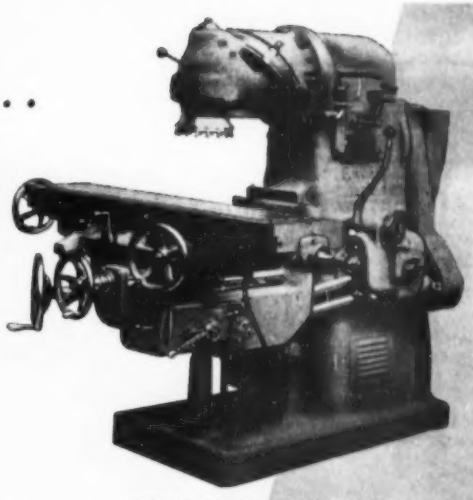

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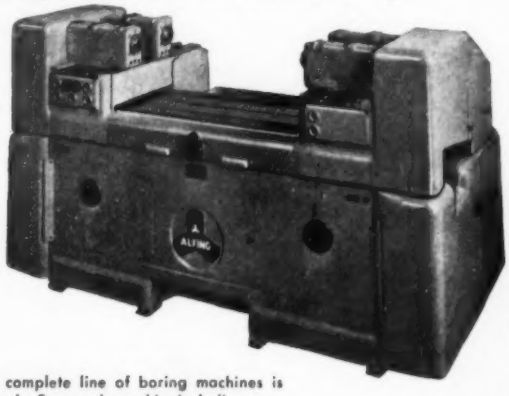

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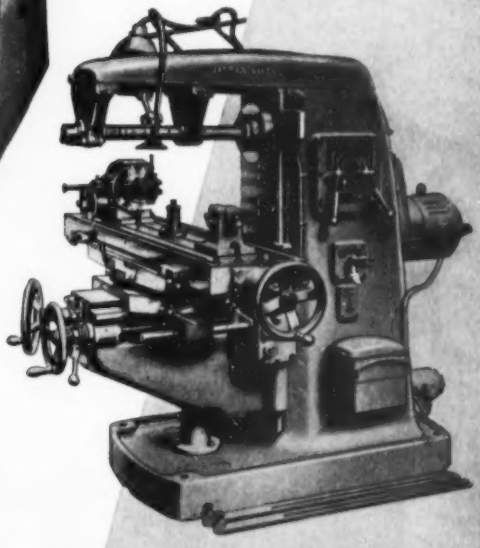

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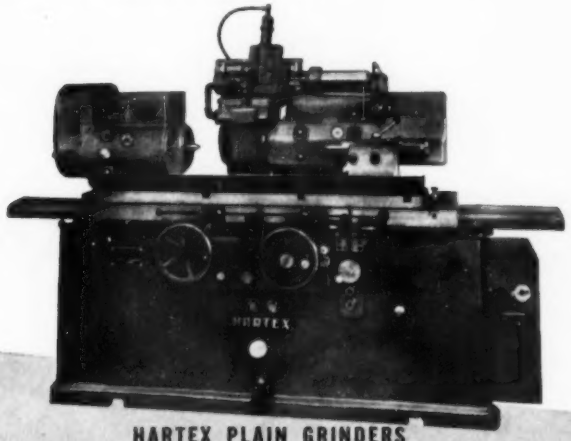

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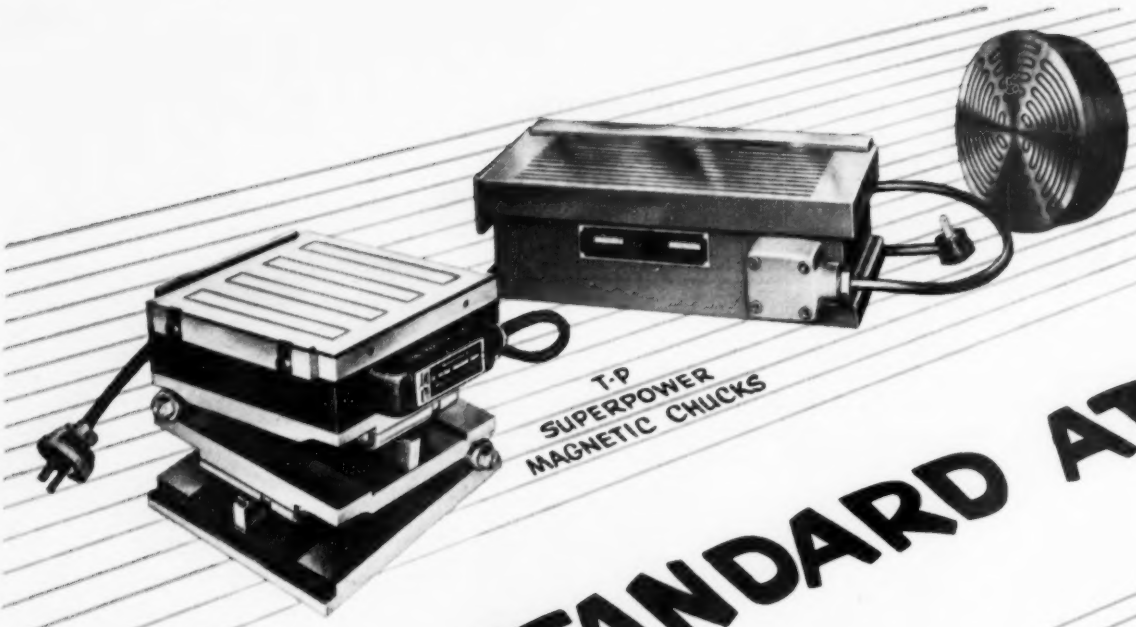


T-P
SUPERPOWER
MAGNETIC CHUCKS

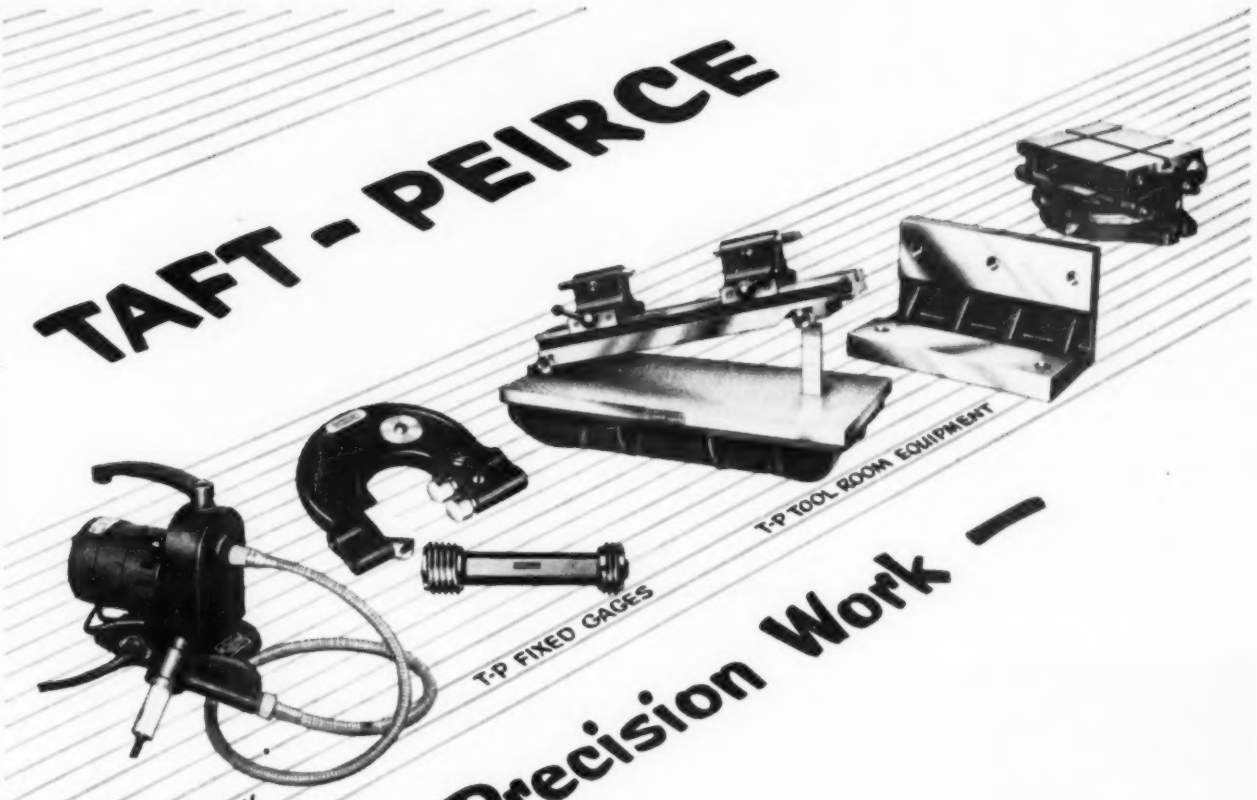
THIS IS STANDARD AT

T-P MACHINE TOOLS

T-P COMPAIRATOR

Production and Inspection Tools

TAFT-PEIRCE



That Speed Precision Work —

Chances are you're already using many items from some of these Taft-Peirce product lines. You should know them all. Each has certain exclusive advantages that set it apart from competitive products. Many of them are actually not competitive at all — since in their own specific field of application nothing else compares. For example:

T-P Superpower Magnetic Chucks pack more power in less space.

T-P #1 Surface Grinders and Lapping Machines easily produce surfaces with an accuracy, flatness, and finish previously considered difficult or impossible.

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T-P Rotochek, a valuable adjunct to the T-P line of fixed gages, is the fastest thread gaging method ever devised. Push — and the gage enters the work. Pull — and it disengages.

T-P Tool Room Equipment includes many special time-and-labor-saving items such as taper testing fixtures and adjustable angle plates to mention only two.

Each of these products is part of a complete Taft-Peirce line. Available in standard or special models tailored to your needs. Full details are described in the new Taft-Peirce Handbook. Write for your copy today.

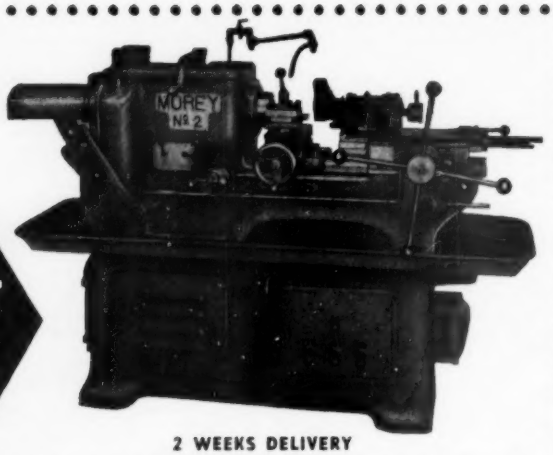
T-P means Top Precision

THE TAFT-PEIRCE MANUFACTURING COMPANY • WOONSOCKET, RHODE ISLAND

For Ease, Economy and Simplicity of Operation

DEPEND ON THE

MOREY No. 2 TURRET LATHE



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PARTIAL LISTING OF SPECIFICATIONS:

Bar work capacity	1" dia. x 6"
Chucking capacity	8" dia.
Swing over bed	14"
Hole through spindle	1-9/32"
Spindle speeds (Back gear ratio): 60-2000 RPM Inf. variations with constant speed, AC 1800 RPM motor 1:5.8	
Motor	3 HP

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The Modern Way

Illustration shows typical set-up for cutting taper keyways with table tilted.

Machines are made in three sizes for keyways 1/16" to 1" in width.

Great simplicity and ease of operation of Davis Keyseaters assure the user of accurate, time saving work.

Let our engineer study your keyseating problems.

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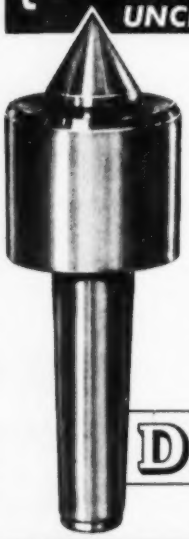
QUADRO PRECISION LIVE CENTERS

UNCHALLENGED ACCURACY!



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Each QUADRO CENTER completely eliminates friction—two double row pre-loaded ball bearings absorb combined radial end thrust. You'll discover its remarkable efficiency on a lathe, miller OR ANY OTHER MACHINE TOOL!

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with that JUST-RIGHT SMOOTH BITE

WHEELS, STICKS, RODS, BLOCKS for machine and manual operations

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One-Operation Burring, Finishing, Cleaning & Polishing

Products of Weldon Roberts Rubber Co., pioneer manufacturer of rubber-bonded abrasives, new, performance-proved BRIGHTBOY BL Abrasives have a definite place in every metal working industry! They fill the rapidly increasing demand for rubber-cushioned abrasives particularly made for fast, smooth finishing of stainless steels, forged aluminum and other metals. Reason:

THAT *JUST-RIGHT* SMOOTH BITE

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This message on the new BRIGHTBOY BL series is reaching thousands of readers of American Machinist, Modern Machine Shop, Machine and Tool Blue Book, Mill and Factory, New Equipment Digest, Metal Working, and Purchasing. ORDER NOW!

Precision finishing with a Precision Abrasive

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Precision gage production
presents a difficult finishing problem.
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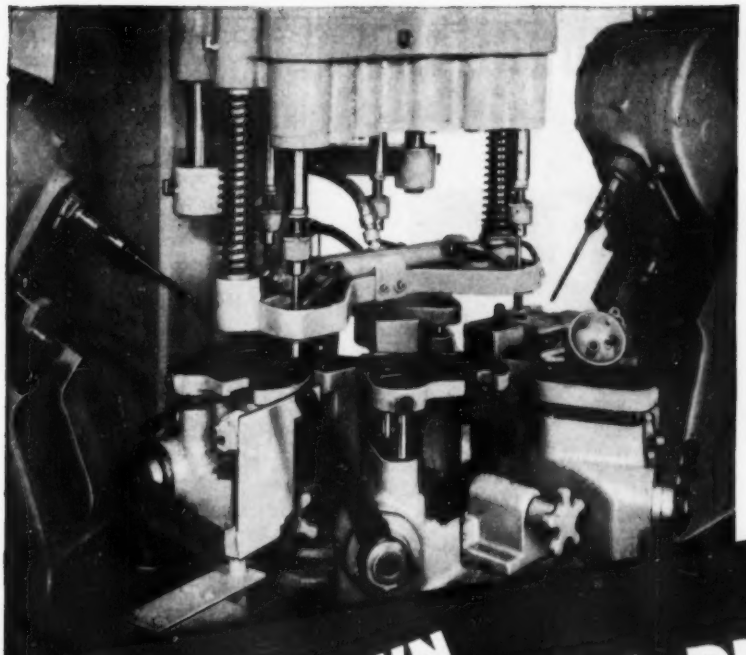
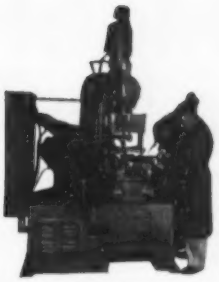
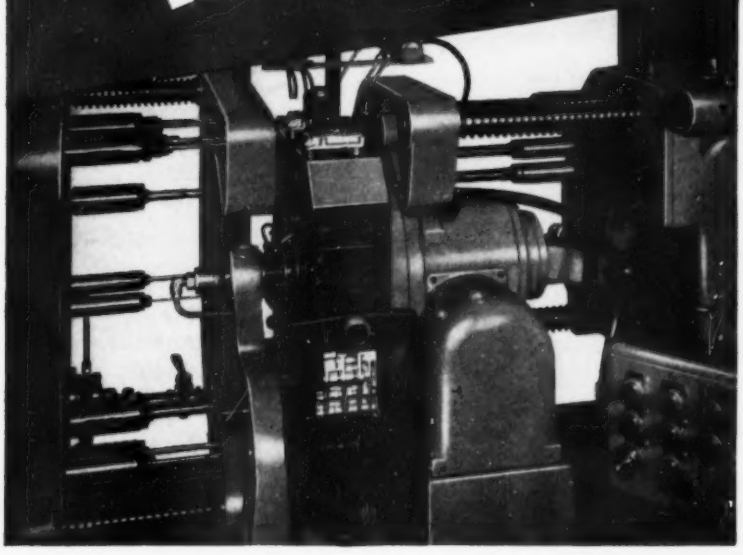
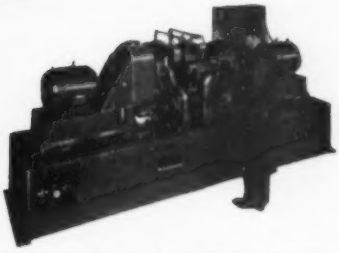




Closeup at the left shows a six station Hartford Automatic single purpose machine rough and finish reaming two cored holes, plus drilling two holes at different angles in die cast aluminum housings.

The LOWDOWN on HIGH PRODUCTION





This view shows a four station Hartford vertical dial type machine drilling, coredrilling and counterboring five holes in aluminum valve bodies.

Hartford Special is ready to design and build a special purpose drilling and tapping machine to boost your production, too. Why not write for more information.

When it comes to production

HARTFORD *Special*

SUPER-SPACERS

Automatic THREAD ROLLERS

THE HARTFORD SPECIAL MACHINERY CO., HARTFORD 12, CONN.

How To Get More Production From Your Taps

Now you can get up to six times more production from taps used in your plant. This amazing increase in tap performance is made possible by a proven method of precision tap sharpening.

PRECISION TAP SHARPENING EXPLAINED

Precision sharpening consists of accurately grinding each tap to provide for uniform spacing of cutting edges, accurate hook angle on each cutting edge, and concentric chamfers. It makes possible an exact duplication of a previous grind.

THE BLAKE METHOD OF TAP SHARPENING

The only combination of machines on the market today which allows you to sharpen taps with this high degree of preciseness is the Blake Flute Grinder and the Blake Tap Chamfer Grinder. These two machines, used in conjunction with each other, enable you to get greatly increased production from your taps. They also help reduce tap breakage and increase effective tap life six times or more.

PRECISION SHARPENING IN OPERATION!

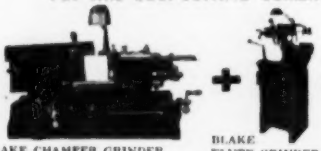
A ⅜"–24 four-fluted tap is ground accurately on chamfer with the No. 1 Blake Tap Chamfer Grinder.

SEND FOR COMPLETE INFORMATION

To get additional information on this subject, write to us for your free copy of the *Machinery* article, "Why Taps Should Be Sharpened Precisely". Technical details about both Blake tap sharpening machines are available in illustrated folders listed below. Ask for them!

IT'S A FACT! YOU CAN REDUCE YOUR TAP COSTS 50 to 75% by installing Blake tap sharpening equipment and sharpening your taps as you do other metal cutting tools.

PUT THIS COST-CUTTING COMBINATION TO WORK FOR YOU NOW!



BLAKE CHAMFER GRINDER (Described in Bulletin 552) + BLAKE FLUTE GRINDER (Described in Bulletin 651) =

ACCURATE, TRUE-CUTTING TAPS
LESS TAP BREAKAGE
600% MORE PRODUCTION PER TAP
UP TO 75% REDUCTION IN TAP COSTS

Write for details about both machines!

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BLACK DIAMOND PRECISION DRILL GRINDERS...
WALTHAM CUTTER SHARPENERS...SURFACE FINISH STANDARDS

From the *American Machinist* Library of *Tips for Top Shop Men*

TAKE a man's pride in his job away, and there isn't much left; he becomes another automaton. Even a trained seal enjoys the applause as much as he does the fish.

WHEN you walk the tight-rope between close tolerances, or between good and bad finish, balance is vital. Be sure you have it, in machine-tool spindle or shaft, in tooling, in fixture. It will pay out in longer tool life and reduced scrap.

FIVE WAYS TO FORM GEARS

1. Powder Metallurgy
2. Casting
3. Extrusion
4. Cold Drawing
5. Plastic Molding

These five processes are some of the methods used to produce precision gears. Each of these methods solves one or more production problems: cost . . . unmachinable material . . . complex shape.

"Five Ways to Form Gears," a 16-page *American Machinist* Special Report, explains each method . . . including latest examples, applications, relative costs, tolerances, and hints on machining.

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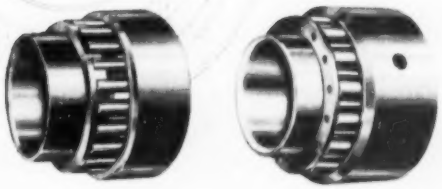
Answer to a LOADed question . . . the best way to handle radial loads is with . . .

HYATT STRAIGHT RADIAL ROLLER BEARINGS



Wherever the jobs . . . and the loads . . . are big, you'll find radial roller bearings smoothing the path of power, because radial roller bearings give the greatest load-carrying capacity within given boundary dimensions. And, whenever radial loads enter the picture, design engineers naturally turn to Hyatt for the most complete line of radial roller bearings available anywhere. The wide range of Hyatt Roller Bearing sizes and types allows the engineer greater design flexibility, makes his job easier. If you are not familiar with the complete Hyatt line, write for our general catalog No. 150. Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS

MORE for your Press Dollar...

with the NEW Rodgers Blue Ribbon Line of Platen Presses

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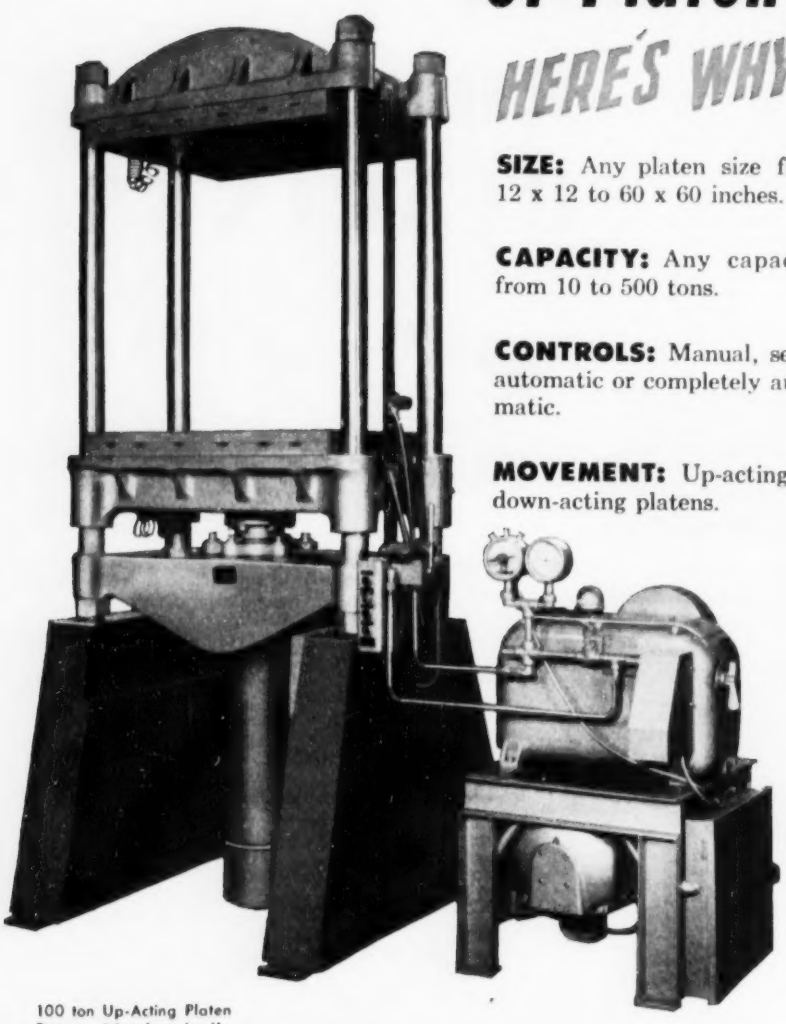


100 ton Up-Acting Platen Press with electrically heated platens—platen area 24 x 36 inches.

SIZE: Any platen size from 12 x 12 to 60 x 60 inches.

CAPACITY: Any capacity from 10 to 500 tons.

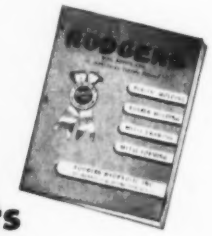
CONTROLS: Manual, semi-automatic or completely automatic.

MOVEMENT: Up-acting or down-acting platens.

PUMPS: Simple positive displacement hydraulic pumps or combination hydraulic pumps with various approach or return speeds.

PLATENS: High grade cast steel guided by heavy bronze bushings and ground and polished cold steel rods.

UTILITY: Select the press to best suit your needs in plastic molding, rubber molding, laminating, metal forming or shaping; also special presses for die tryouts and other utility operations.



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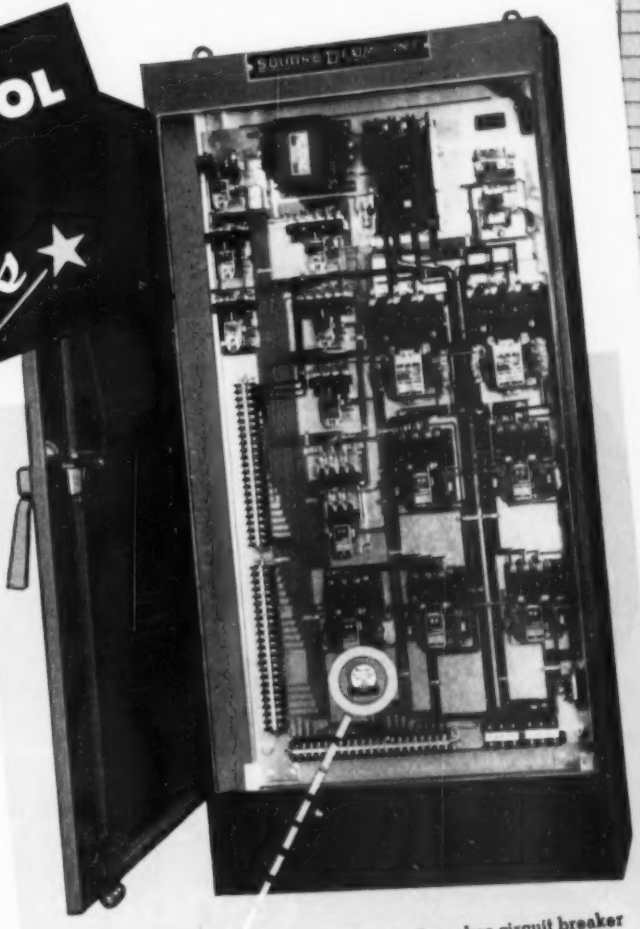

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Plus **FIELD ENGINEERING SERVICE** *through experienced, practical engineers stationed in principal cities.*

Electrical standards for machine tools are published by the NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION for general industry use and by the JOINT INDUSTRY CONFERENCE for the mass production industries. By specifying control built to these standards, users benefit from the combined experience and judgment of engineers in a wide variety of industrial plants. The construction features required assure maximum safety, uninterrupted production and long service.

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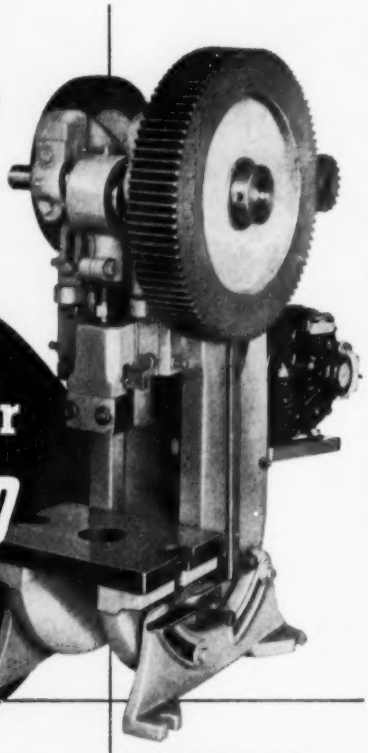

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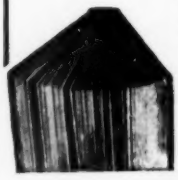

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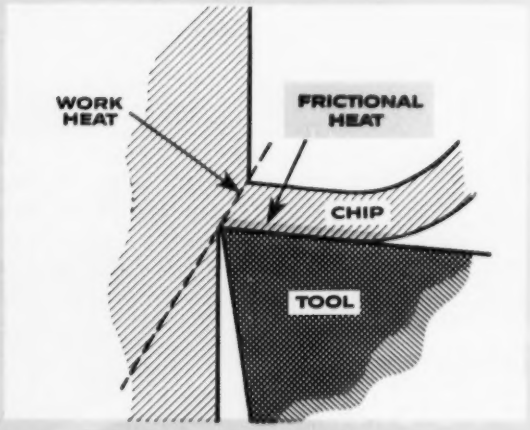

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1. **WAX-COOL** stays with tools and material even under high heat and pressure.
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Here is proof!

Parts of a stud driving gun made of #4140 annealed alloy steel. Both parts machined on same turret lathe. Smooth finish shown at left resulted from Wax-Cool's greater lubricity. Rough, poorly finished part on right shows results obtained from ordinary coolant.

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Ask about Wax-Cut—*wax-type cutting oil for automatic screw machines, gear cutting machines, etc.*

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Mac-it®

YOU GET

PEAK PERFORMANCE

STRENGTH WITHOUT BULK

Lower cost, smaller size Mac-it Screws can be used for all fastening jobs because of their exceptional tensile and torsional strength. Made from special Mac-it Alloy Steel held to rigid specifications, Mac-it Screws insure uniform and dependable screw performance.

SPECIAL SCREW PRODUCTS

Mac-it is geared for large or small run production of screws with special design or strength characteristics. The high quality of Mac-it special Alloy Steel adapts it to heat treatment that penetrates throughout the screw structure so that the center possesses the same sturdy toughness as the outside. Each type Mac-it Screw is heat-treated for maximum strength in its specific use.

PRECISION FASTENERS

The precision manufacture and quality control used in making Mac-it Screws provide users with high dimensional accuracy and uniformity. All Mac-it Screws in both coarse and fine threads are held to a class-3 fit. Mac-it maintains a fastener engineering service for the design, development and production of screws for all types of applications.

DISTRIBUTOR SERVICE

Contact any of the hundreds of Mac-it distributors from coast to coast for immediate service to supply your requirements for standard or special screw products.

MAC-IT SCREW DEPARTMENT

STRONG, CARLISLE & HAMMOND COMPANY

1392 W. 3RD. STREET · CLEVELAND 13, OHIO

Manufactured by Mac-it Parts Co., Lancaster, Pa.

Contact your nearest Mac-it Distributor or the Home Office, Cleveland, Ohio, for full information on how Mac-it can solve your screw problems.

HEX HEAD CAP SCREW • ROUND HEAD SCREW • FLAT HEAD SCREW • ROUND MACHINE SCREW
SLOTTED SET SCREW • SQUARE HEAD SET SCREW • THIN POST SCREW • FILLISTER HEAD SCREW

test metal hardness

directly on any size job!

Accuracy guaranteed by individual calibration of each instrument. Direct dial readings . . . no conversion charts or calculations. Available in Rockwell "A", "B", "C", "15N" and Brinell Scales. Tests any size, shape, type metal, on-the-job!

WRITE FOR FREE BOOKLET ET438 OR DEMONSTRATION

Territories open. Distributers Inquire!

EMST

portable metal hardness testers

Manufactured in the United States

NEWAGE INTERNATIONAL, INC.

235 EAST 42nd STREET, NEW YORK 17, N. Y.

IN CANADA: NEWAGE (CANADA) LIMITED, 1174 BAY STREET, TORONTO, ONTARIO

A SPECIALIZED CAM MILLING SERVICE, SPOT AND BUTT WELDING, TURNTABLES, POSITIONERS FOR BRAZING, SPRAYING, WELDING, SOLDERING OVER 100 TYPES CONTRACT PRODUCTION, SPECIAL AUTOMATIC MACHINES.

EISLER ENGINEERING CO., INC.

738 So. 13th St., Newark 3, N. J.

choose

FERRACUTE INCLINABLES

Fast . . . economical . . . dependable

Complete line of mechanical presses. Since 1863

FERRACUTE MACHINE CO., Bridgeton, N. J.

SINCE 1901

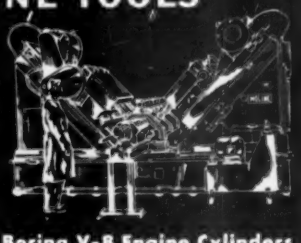
MOLINE "Hole-Hog"

SPECIALLY DESIGNED

MACHINE TOOLS

have cut production costs for American Industry.

DRILLING • BORING
HONING • TAPPING
and Special Machines



MOLINE TOOL CO.
HOLE-HOG
MOLINE, ILLINOIS

Boring V-8 Engine Cylinders

That's Right, My Lad -PLAY SAFE!

ARBORS not in use should be stored in a rack, suspended by the flange, as shown above.

This young catcher has the right idea. He wears a mask behind the bat. He doesn't believe in taking any unnecessary chances.

Many a shop foreman . . . or superintendent, for that matter . . . could learn a lesson from this cautious youngster. For often a shop executive has to "take-it-on-the-chin" when vital production schedules are disrupted.

For example, when a milling machine arbor breaks down, production ceases instantly. Both machine and operator become idle, and their supervisor is in a dilemma . . . UNLESS a spare arbor is immediately available.

So play safe! Keep several spare arbors on hand for emergencies. Remember, arbors are classed as "perishable tools" and their cost today is relatively small.

Kempsmith Arbors in all popular sizes and types are regularly carried in stock. Every one is a precision-built tool, adaptable to ANY make of milling machine equipped with standardized spindle. Fill-in and mail coupon for copy of Kempsmith Arbor Bulletin No. 116.

THE KEMPSMITH MACHINE CO.

1823 S. 71st Street Milwaukee 14, Wis., U. S. A.

Arbors BY KEMPSMITH

Precision Built Milling Machines Since 1888

Write Today!

KEMPSMITH — Yes, I would like to receive a copy of your new Arbor Bulletin:

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A 4746 IPC

DO YOU NEED

Surface Grinding to Gage Tolerance?

Dependable Grinding Performance in Production?

Positive Dust Protection?

. . . if so, Boyar-Schultz No. 6-12 is the Surface Grinder for YOU!

It has the capacity to handle the biggest part of the tough assignments encountered in any shop. It has the accuracy to obtain the high precision needed in tool and gage making. In production it proves so sturdy that long runs, with accuracy, are no problem.

The New Dust Collector, made specially for No. 6-12 Surface Grinder is furnished as optional equipment and is built into the Grinder at the factory. With this Dust Collector no more floor space is required.

BIG MACHINE PERFORMANCE—Small Machine Cost

BOYAR-SCHULTZ CORPORATION

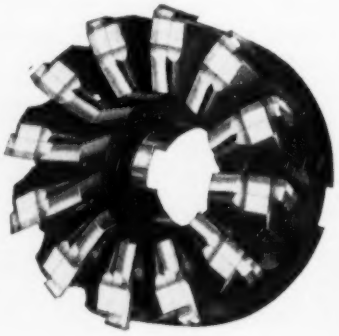
2109 WALNUT STREET • CHICAGO 12

APEX TOOLS

INSERTED-BLADE MILLING CUTTERS

Here's a "BIG BULL" Cutter *for your* HEAVY DUTY JOBS

APEX offers many cutters for many jobs. Here's one that takes a big chip fast. It can be had with H.S.S., Stellite, Cobalt or Carbide tipped blades. These blades adjust automatically in two directions. No damage to carbide tips. Diameters from 8" to 24". We also make cutters for *lighter* work. Write for catalog.



APEX TOOL & CUTTER CO., Inc., Shelton 10, Conn.

BEAUTIFUL HONOR ROLLS
in the finest Statuary Bronze
INCENTIVES — SERVICE AWARDS

The ACROMARK Company

7-13 MORRELL ST., ELIZABETH 4, N. J.

Mold your own LEAD HAMMERS

Here's the inexpensive, fast way of molding and remolding your own lead hammers with this COOK mold and ladle. It produces hammers that can "take it". Simple to operate.

Write for circular and prices

LAWRENCE H. COOK, INC.
68 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

. . . MAKES THE FINEST IN . . .
COUPLING BOLTS
MILLED STUDS
CAP SCREWS
SET SCREWS

*Wm. H. Ottemiller CO.
YORK, PENNA.

Write for name of nearest distributor and our free illustrated folder.

Give Your Ejection Problems the Air

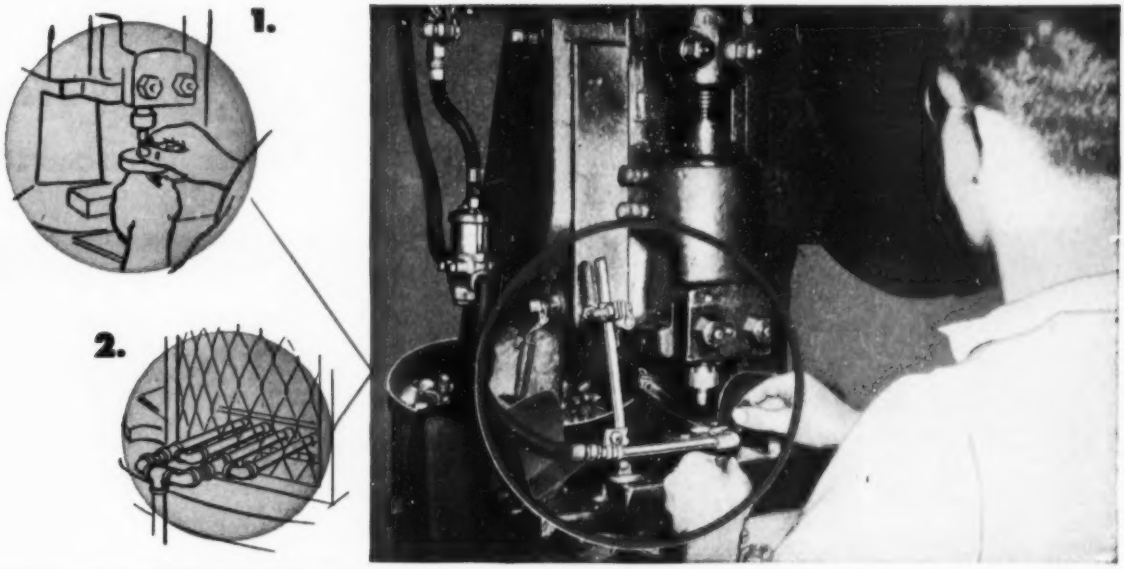
...and boost production and safety

❶ End slow, dangerous hand removal of work with a Schrader Air Ejection Set. Install Schrader Air Ejection Sets on your power presses—or any machines with moving parts to actuate a cam or sliding tripper. You'll find production soars—up to 100% ... operator safety is boosted 50%. Replace hand removal with Schrader Air Ejection and watch your presses take a new lease on life.

❷ Replace wasteful, homemade steady air blasts with Schrader Air Ejection Sets. Air costs drop as much as 90% because Schrader Air Ejection Sets ration out *just enough* air to do the job... synchronize your air blast with demand. Before you decide your old compressors have reached full capacity, check with Schrader to see how to cut air waste.

Schrader Air Ejection Sets are delivered fully assembled and ready to go to work. Their low cost is more than repaid in just a few weeks.

See how Schrader Air Ejection Sets will help you plan more effective use of machines. Write, describing the machines on which their use is contemplated—or fill out the coupon below.



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Air Cylinders • Operating Valves • Press & Shear Controls • Air Ejection Sets • Blow Guns • Air Line Couplers • Air Hose & Fittings • Hose Reels • Pressure Regulators & Oilers • Air Strainers • Hydraulic Gauges • Uniflare Tube Fittings

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Company _____

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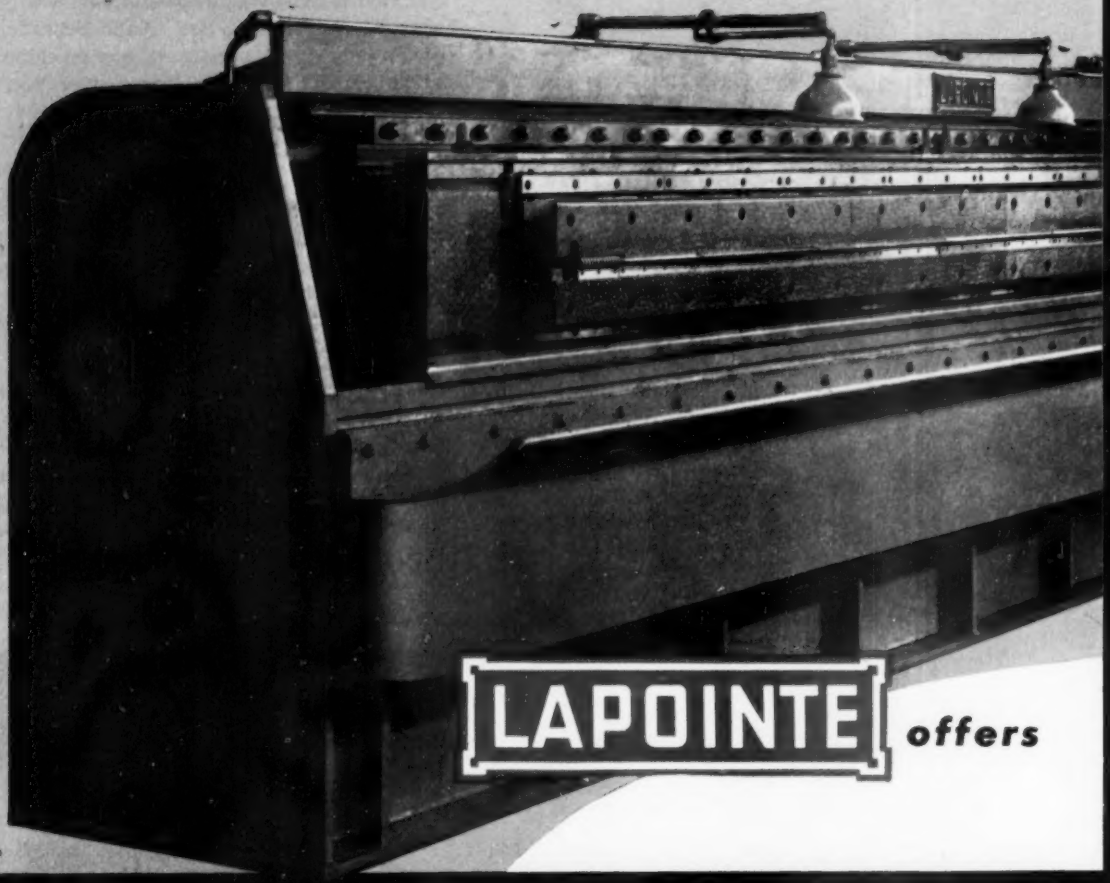
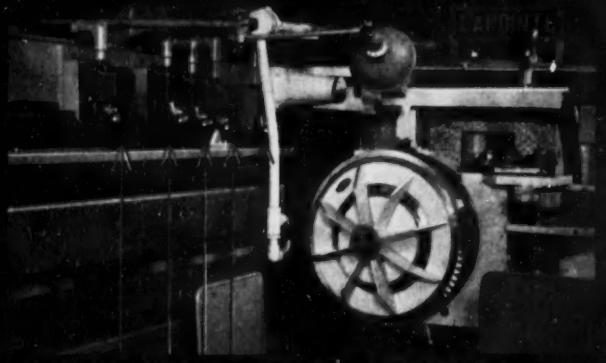


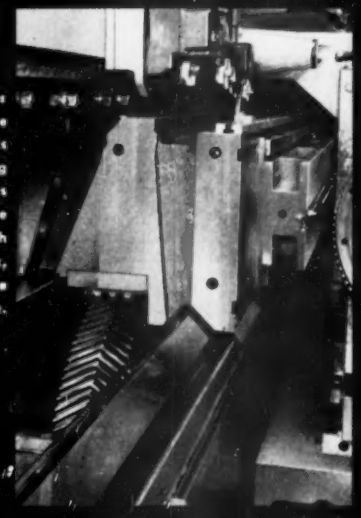
LAPOINTE offers



LIMIT SWITCHES for operating DUAL SPEED and DUAL CYCLE (Patented*)

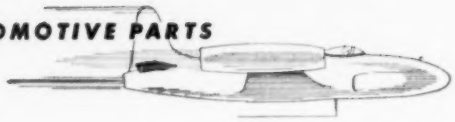
The Dual Speed feature permits the machine to be operated at two predetermined speeds for the same broaching stroke. Dual Cycle is the exclusive LAPOINTE feature that has been developed for successful broaching of jet engine components without requiring tool changeovers for the accuracy required.

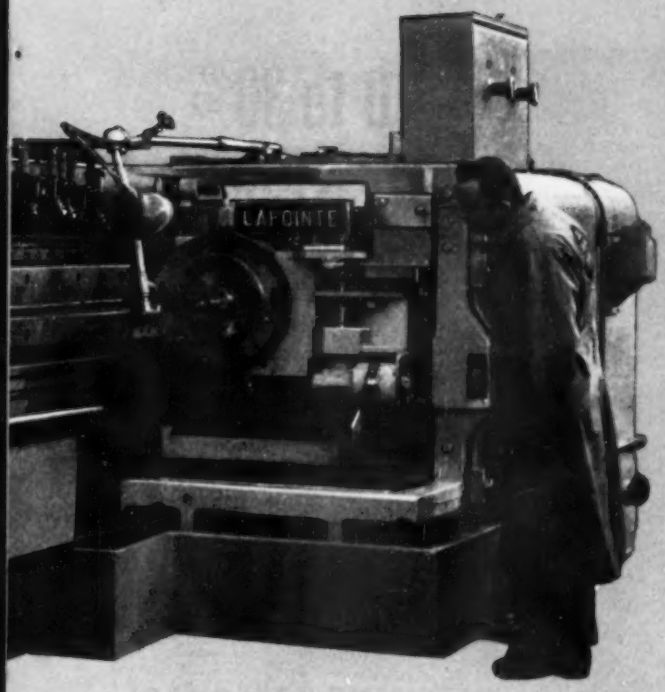
Two of the reasons [illegible] for the smooth, positive functioning of this new LAPOINTE Broaching Machine are seen in this picture showing the large diameter continuous-tooth herringbone gear and rack, and the guiding of the massive main slide.



*No. 2,617,333

FASTER BROACHING OF JET ENGINE PARTS AND AUTOMOTIVE PARTS





LAPOINTE 30/180" SRHE, 2 broaching Turbine Wheel J57.

The electro-mechanical drive accounts for the remarkable versatility and flexibility of this newly developed single ram horizontal broaching machine. Note that the cutters are *at eye level.*

new ELECTRO-MECHANICAL DRIVE *horizontal* BROACHING MACHINE

for SURFACE BROACHING *at speeds up to* 300 fpm!

Now, for the first time, there is practically unlimited opportunity to make tests to determine the best broaching speed for any particular metal! Once the proper speed is found, this new LAPOINTE Broaching Machine will give

- **substantially increased production**
- **better finish and**
- **greater accuracy through freer cutting action.**

Carbide-tooth broaches and HSS broaches both perform exceptionally well on this machine, which is fully described in a new bulletin available on request. Ask for *Bulletin SRHE-1.*

Another striking example of Lapointe engineering leadership, with everything designed and built at one source . . . no divided responsibility!

Industry looks to Lapointe for the latest developments in broaching machines, tools, and fixtures.

THE LAPOINTE MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

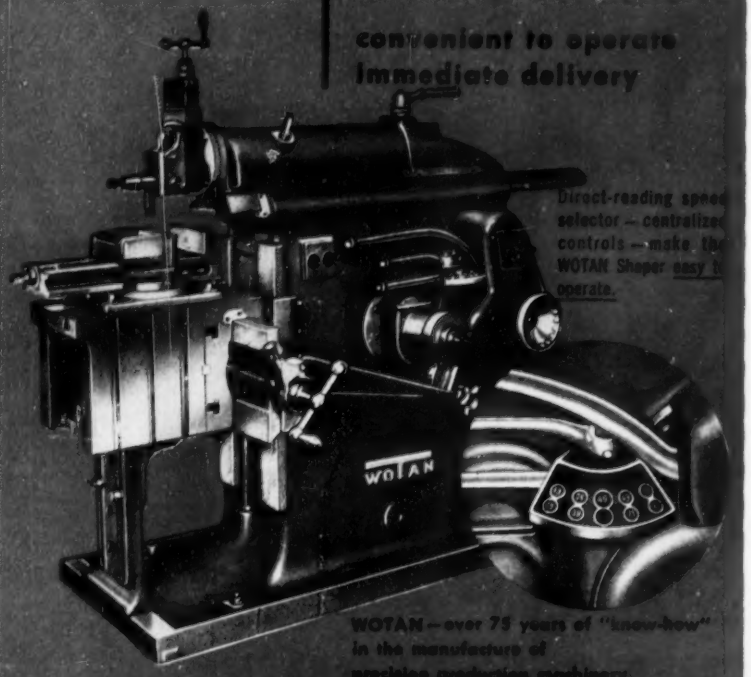
In England: Watford, Hertfordshire

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHING MACHINES AND BROACHES

WOTAN

22" and 16" shapers for tool room and production

convenient to operate
immediate delivery



Direct-reading speed selector — centralized controls — make the WOTAN Shaper easy to operate.

WOTAN — over 75 years of "know-how" in the manufacture of precision production machinery.

More than 20,000 in use throughout the world.

Favorable manufacturing conditions permit unusually low price. Immediate delivery from our Brooklyn warehouse and from dealers' stocks throughout the country.

for full details write, phone, or wire

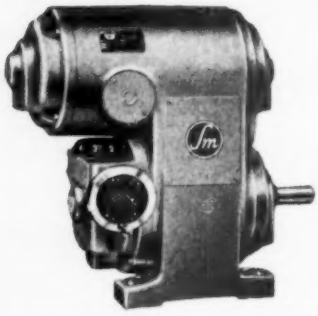
Parker Machine Company, Inc.

[illegible] ST., BROOKLYN 37, NEW YORK — TRIangle 5-[illegible] and [illegible]

10 to 30% Increase in Wire Production

Universal Chain Company of New Jersey, using Speed-Trol on their wire drawing machine, in addition to increasing production 10 to 30 per cent, had a corresponding reduction in labor costs and a definite improvement in employee morale through greater ease and safety of operation.

STERLING SPEED-TROL



GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

Equipment adaptation to: Sequence synchronization — operators' abilities — load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

Process control of: Temperature — viscosity — level — pressure — flow — etc.

Time control of: Baking — drying — heating — cooking — pasteurizing — soaking — chemical action — etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality & profit.

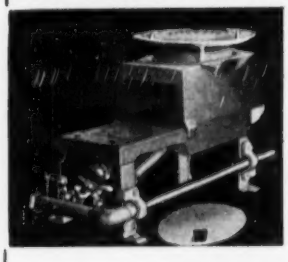
20-page illustrated catalog . . . Sterling Speed-Trol, Slo-Speed, Klosd and Klosd-Tite Electric Power Drives. Write for catalog No. 410

STERLING ELECTRIC MOTORS

Plants: New York City 51; Van Wert, Ohio; Los Angeles 22; Hamilton, Canada; Santiago, Chile
Offices and distributors in all principal cities

BUZZER *Gas Fired* **FURNACES**

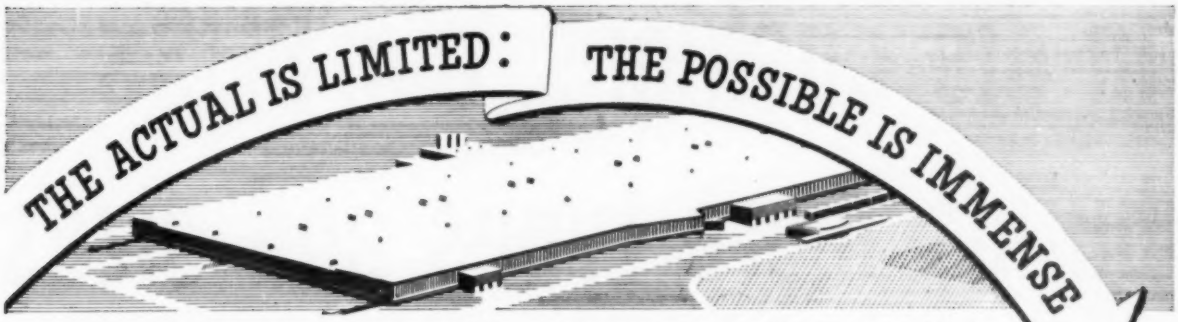
NO BLOWER OR POWER NEEDED . . . *just connect to gas supply*



Here's speed, economy and lifetime service in this most efficient and economical soldering and general purpose bench furnace. This #22 furnace heats a pair of 12 lb. soldering coppers in 8 minutes. Can be used for melting lead, heating small tools, etc. Since 1911 BUZZER Soldering Furnaces have been the equipment of thousands of industrial plants, shops and schools.

Write today for catalog showing various types of furnaces, burners and other equipment.

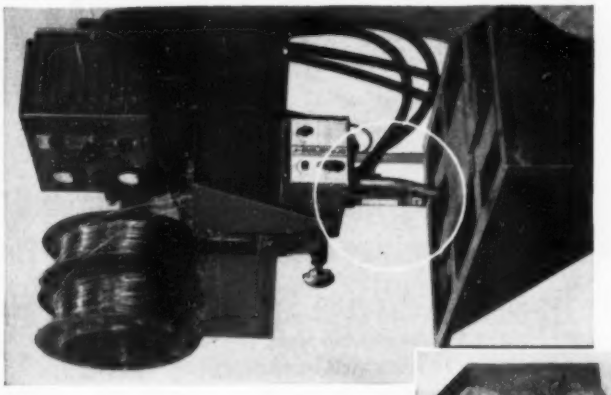
CHARLES A. HONES, INC.
121 South Grand Avenue, Baldwin, L. I., N. Y.



NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

© LE Co. 1953

"TWINARC'S" FASTER, LOWER COST WELDING BOOSTS SHOP EFFICIENCY



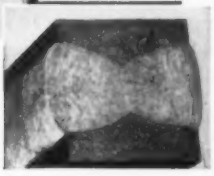


Fig. 2. Automatic Lincolnweld LAF-2 *with new "TWINARC" attachment. "TWINARC" replaces original single electrode jaws. Operates with same single controls. Inset shows butt weld in 1-½" plate with single pass on each side with "TWINARC". Welding speed is 38% faster than possible with single electrode.*

IT is now possible to realize savings up to 35% in the cost of automatic welding with Lincoln's new "TWINARC". Welds have deeper penetration, greater uniformity . . . and are produced at *speeds 50% higher* than possible with single electrode automatic welding.

Reports from code welding fabricators indicate quality superior to conventional automatic processes.

With "TWINARC", welding currents up to 1200 amps are concentrated on two small diameter electrodes (Fig. 1). These electrodes can be set in line with the work for tandem welding to attain maximum penetration at high speed. For welding thin material or assemblies with poor fitup the "TWINARC" head may be rotated in any position to 90 degrees across the joint to spread the arc, reducing the danger of burning through.

"TWINARC" welding is only one of many new Lincoln developments designed to cut your costs. Have your representative survey your needs and recommend latest Lincoln techniques to speed welding, to simplify your operations and save money.

INCREASES WELDING SPEEDS 50% AND HIGHER! TO CUT YOUR COSTS

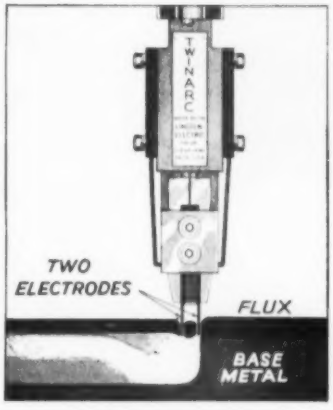


Fig. 1. New Lincoln "TWINARC"... *feeds two continuous electrodes simultaneously for faster, more efficient "hidden arc" welding in granular flux.*

Results... utilizes currents up to 1200 amps, produces deeper penetration, higher quality welds, at lower cost.

HANDLES A WIDER RANGE OF WORK

ANOTHER LINCOLN FIRST

GET THE FACTS — *Bulletin on "TWINARC" welding giving latest speeds and procedures is available by writing on your letterhead to* **Dept. 2004.**

THE LINCOLN ELECTRIC COMPANY

CLEVELAND 17, OHIO

THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

In die cushions, too, BLISS builds more types and sizes than any other company...

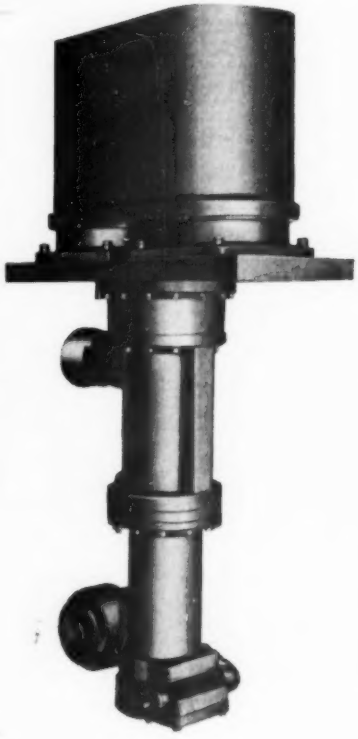
Bliss-Marquette Die Cushion Engineering Ranges from Standard "A" and "C" Types for Punch Presses to large Specials like this Hydro-Pneumatic

The *right* die cushion for a given application can make a lot of difference in press operation. That's why Bliss engineers have created a multitude of types and sizes to suit individual situations. Bliss designs have demonstrated their effectiveness over many years by...

- ***Permitting deep draw operations at low cost***
- ***Eliminating operations***
- ***Prolonging die life***
- ***Reducing spoilage***
- ***Preventing excessive strains***
- ***Adding another action to presses***

Since these cushions can eliminate many difficulties and make possible substantial savings, *all Bliss S-1, S-2 and Inclinable presses are designed and machined to accommodate them.* Bliss cushions are easy to install, easy to maintain and easily adjusted for work involving any pressures within their capacities.

Bliss builds die cushions in a large number of types and sizes to meet practically any possible condition. You're likely to find the cushion to suit your particular need in Bliss' 60-page Reference Book on types, uses and care of die cushions. Write for your copy.



E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

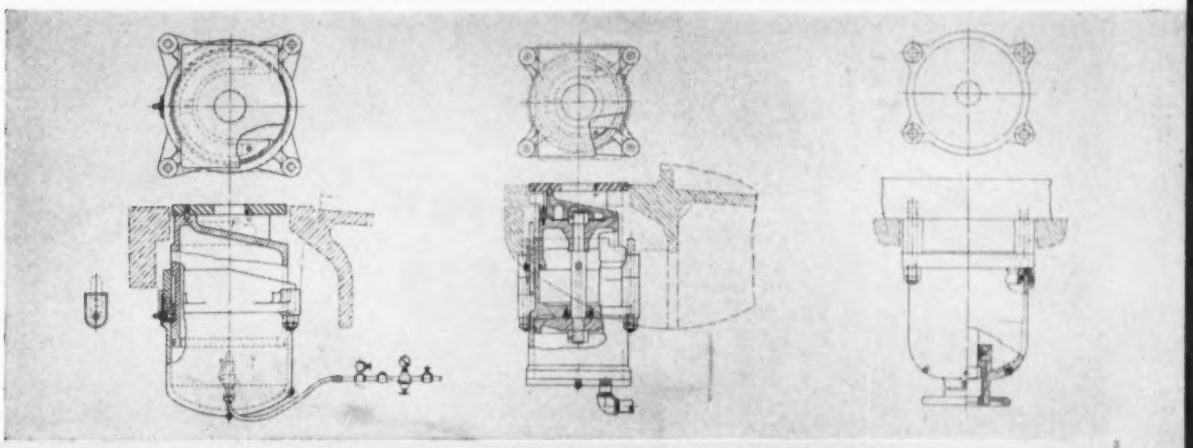
E. W. Bliss Company (Paris), St. Cuen sur Seine, France

U. S. Plants in Canton, Salem and Toledo, Ohio; and Hastings, Michigan
Branch offices in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada. West Coast Representatives: Moore Machinery Co., Los Angeles and San Francisco; Star Machinery Company, Seattle. Other dealers in United States cities and throughout the world.

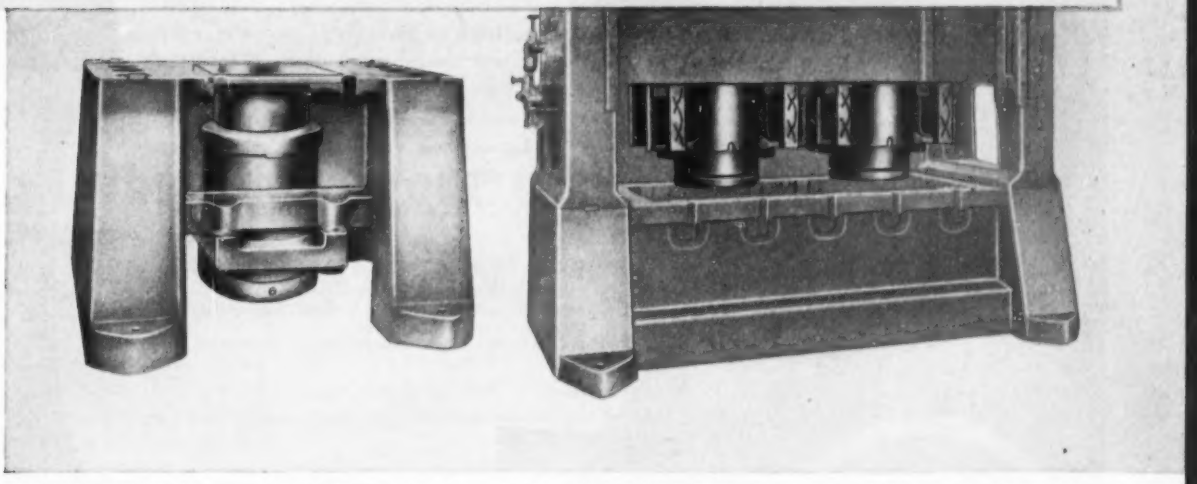
Remember: **for DIE CUSHIONS, Presses,**

FOR INCLINABLE PRESSES Bliss makes a complete series of pneumatic cushions; Type CO (left), requiring no tank for standard strokes; Type CCO (center), requiring a tank only when stroke is over 2", similar to Type CO but with two pistons and cylinders to deliver greater pressures; Type GA (right), having a hollow piston shaft for easy slug removal, self-contained for strokes up to 1".

Note that Type CO and CCO cushions are arranged with openings in the pressure pad to suit the job so that slugs or scrap may be dropped through the die.



Why these Bliss-Marquette Die Cushions for inclinable and straight side presses can improve press room efficiency



FOR S-1 PRESSES Bliss recommends Type CC cushions which feature extra long internal guides to prevent side movement or weaving of the pressure pad. Locking devices can be furnished.

FOR S-2 PRESSES Bliss recommends Types C and CC cushions. The compact design of Type CC permits installation of a double cushion that will draw up to 8".

Rolling Mills, Special Machinery...

It's Bliss

REFRACTORIES
HAND GRINDING
WELD FINISHING
BAY STATE BAYFLEX
RUBBER REGULATING WHEELS
HONING
CENTERLESS GRINDING
Ready for Tomorrow's BETTER GRINDING!
CUTTER GRINDING
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No. 520 GRITCLOTH
MODERN SANDING
KOOLPORE ®
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ABRASIVE DISCS
SEGMENTS
GENERAL GRINDING
OILSTONES
SURFACE GRINDING
BAY STATE SAF-T-CUT
WELD GRINDING
SUPERFINISHING
Looking Ahead,
BAY STATE sees real progress in both materials and methods for increased quality and production. Here at BAY STATE, we are ready with the abrasive products to make such progress possible . . . both now and in the future.
Let us show you what we mean when we say:
YOU CAN GRIND BETTER WITH BAY STATE
BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Mass., U. S. A.
Branch Offices and Warehouses: Chicago, Cleveland, Detroit, Pittsburgh
Distributors — All Principal Cities
In Canada: Bay State Abrasive Products Co. (Canada) Ltd., Brantford, Ont.
BAY STATE ®
MASONRY BLADES
CARBIDE TOOL GRINDING
INTERNAL GRINDING

All Hands are "TOP HANDS"

...when they work with SIMONDS "RED END" Hacksaw Blades

It's fast, easy cutting on any material . . . when the hand-frame holds the right "Red End" Blade for the job. That's why those who know, insist on the blade with this famous trade-mark.

On the economy side, Simonds "Red End" Blades are uniformly hardened for better cutting performance and lowest cutting costs. What's more, teeth are accurately milled and precision-set . . . for straighter cutting and longer life. And Simonds offers a choice of three types of blades — Standard, Molybdenum or High Speed Steel — Hard Edge or All Hard — to provide a "right" blade for your job.

Get delivery from stock from your Simonds Distributor.

For PROMPT DELIVERY and PERSONAL SERVICE . . . call your INDUSTRIAL DISTRIBUTOR

SIMONDS SAW AND STEEL CO.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon. Canadian Factory in Montreal, Que. Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

There is hardly anything in this world
that some man cannot make
a little worse and sell a little cheaper,
and the people who consider price only
are this man's lawful prey.
JOHN RUSKIN

Placed side by side, similar bushings of different make may look alike — *but are they?*

A·B·C Bushings are, and always have been made from only chromium, or chromium-tungsten oil hardening tool steels having wear resistance 18.5% greater than that of regular carbon water hardening tool steels.*

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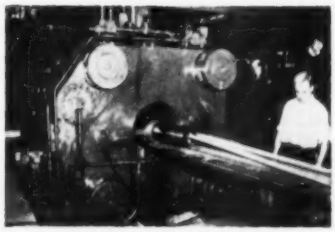

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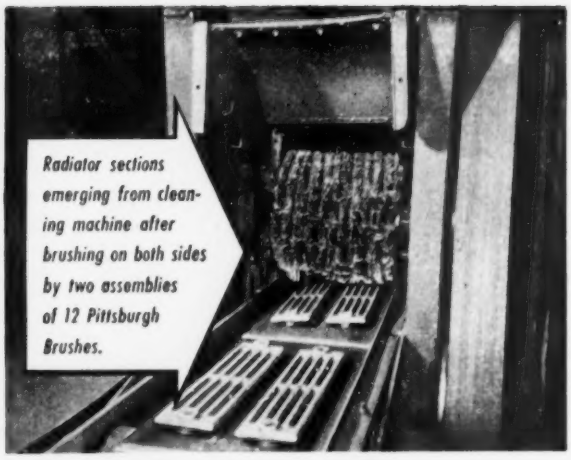
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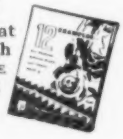

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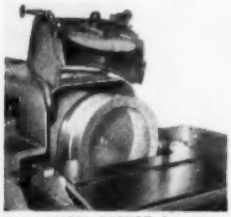

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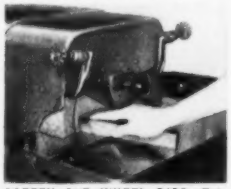

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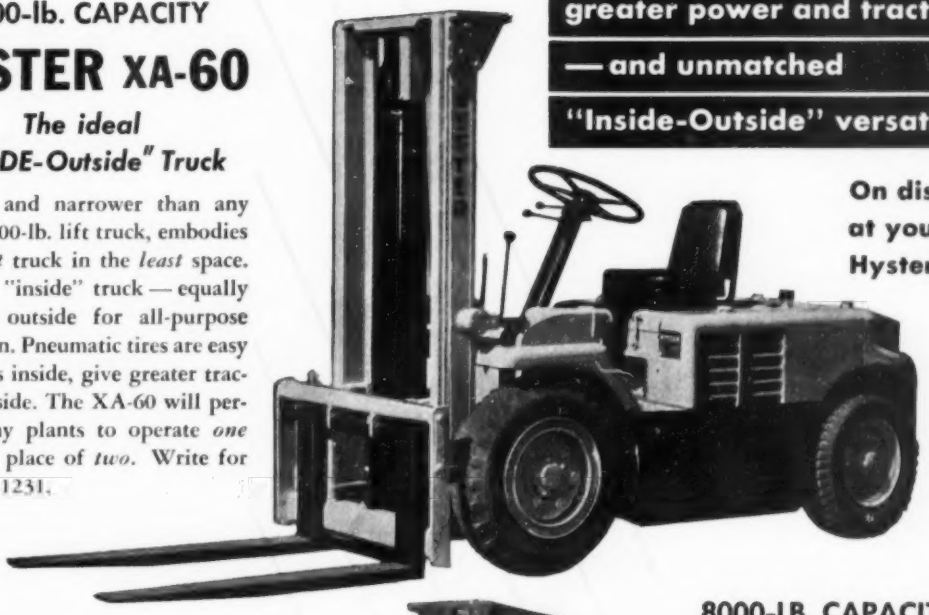

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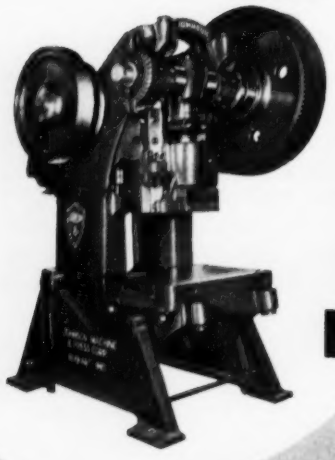

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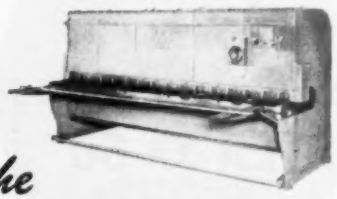

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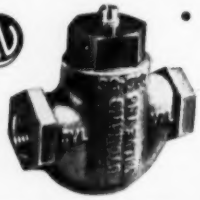

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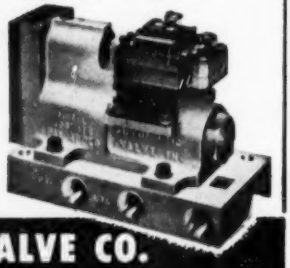

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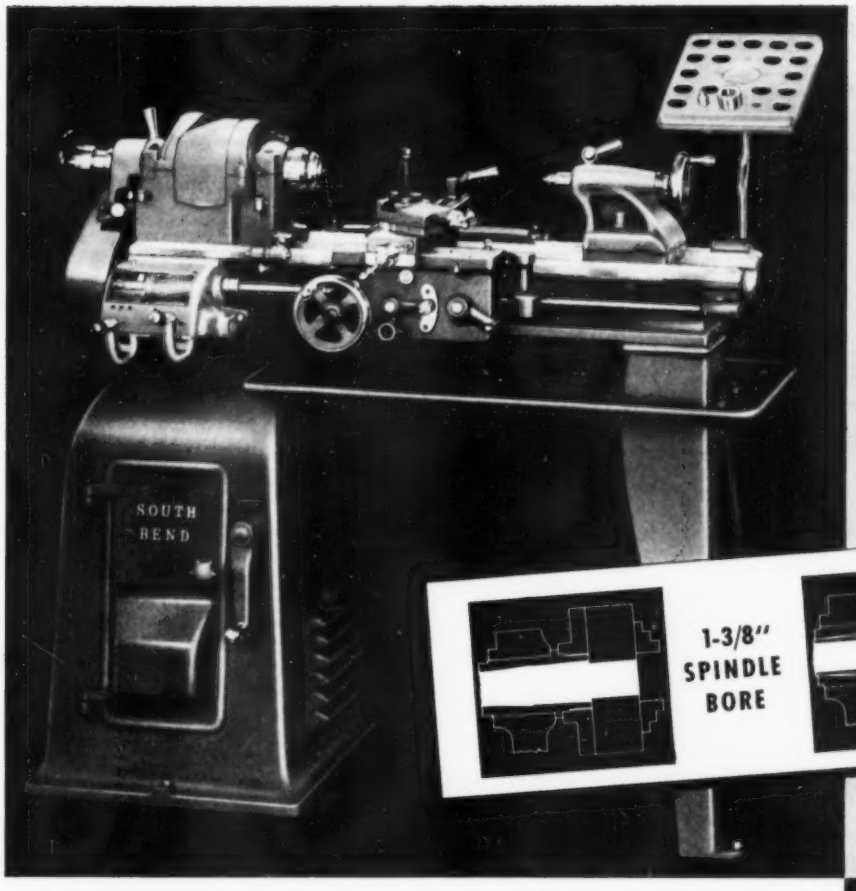

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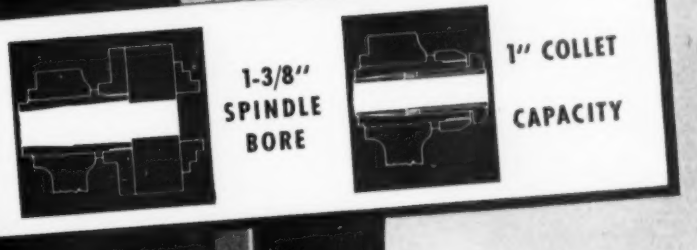

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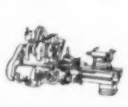
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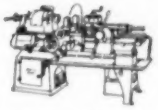
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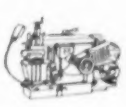
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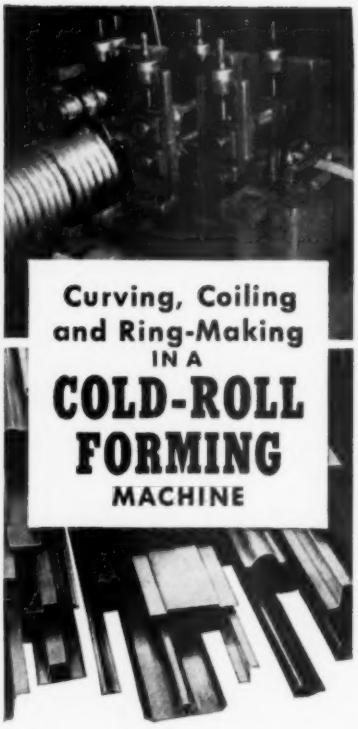

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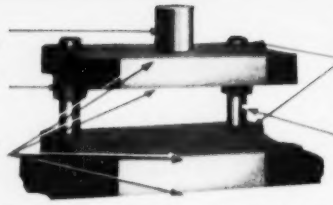
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"Detroit" bushings are full-bearing
Parallel surfaces held to exceptionally close limits
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DETROIT DIE SET ★

KUTMORE ADJUSTABLE HOLLOW MILLS

ENGINEERED FOR... PRECISION PRODUCTION

- ANY COMBINATION OF . . . TURNING . . . TAPERING . . . FACING . . . CHAMFERING . . . TREPANNING IN **ONE PASS.**
- EXCLUSIVE **MICROMETER** ADJUSTMENT FEATURE FOR RAPID SET-UP.
- CUTTING CAPACITIES FROM 1/32" to 2" DIAMETER IN STANDARD STOCK. IMMEDIATE DELIVERY.

WRITE FOR CATALOGUE No. 20 AM

OUR ENGINEERING DEPARTMENT IS AT YOUR DISPOSAL ON YOUR HOLLOW MILL PROBLEMS

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cut power blade costs at least 15% with

VICTOR "Moly"® Blades

Yes, that's right—when you order VICTOR Moly Power Blades from your Distributor, you cut your initial blade cost 15%, and you'll get extra economies through faster, more efficient cutting and longer blade life.

Over the years, *quality* has made VICTOR Blades the blades industry prefers.

YOUR DISTRIBUTOR HAS VICTOR BLADES IN STOCK

For VICTOR Blades—as well as hundreds of other products you regularly buy—your Industrial Distributor is the man to call. He is close to your problems. He gives you fast service. He has the assistance of trained factory representatives in solving many of your every day production problems. Buy all you can from him.

VICTOR Hand and Power Hack Saw Blades Are Sold Only Through Recognized Distributors.

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SAW WORKS, INC. • MIDDLETOWN, N.Y. U.S.A.

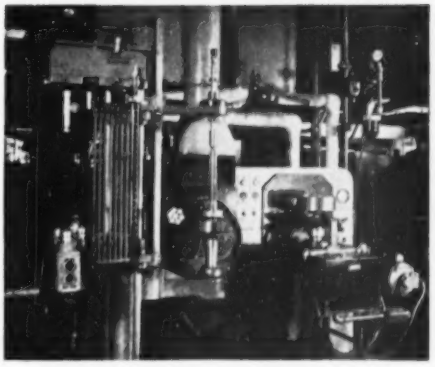
Makers of Hand and Power Hack Saw Blades, Frames and Metal Cutting Band Saw Blades

1624

with TOCCO* Induction Brazing

THIS is the "planetary output shaft" for the Packard Ultramatic Transmission. It was originally designed to be made from a forging, but Packard engineers "took a second look" and determined that a slight design change, using a casting and a steel shaft, permitted taking advantage of Induction Brazing. This resulted in a savings of $74,325 in the equipment and tooling for production, in addition to the actual labor and materials savings of $1.74 per assembly.

When designing *your* new product, or redesigning present products for more economical manufacture, you will profit by considering TOCCO Induction Heating for brazing, hardening, soldering, forging or shrink-fitting. Designing for Induction Heating pays off!



A 30 KW, 10,000 Cycle TOCCO Unit Brazes 45 Assemblies per hr.

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Please send copy of "Design and Manufacture for Profit".

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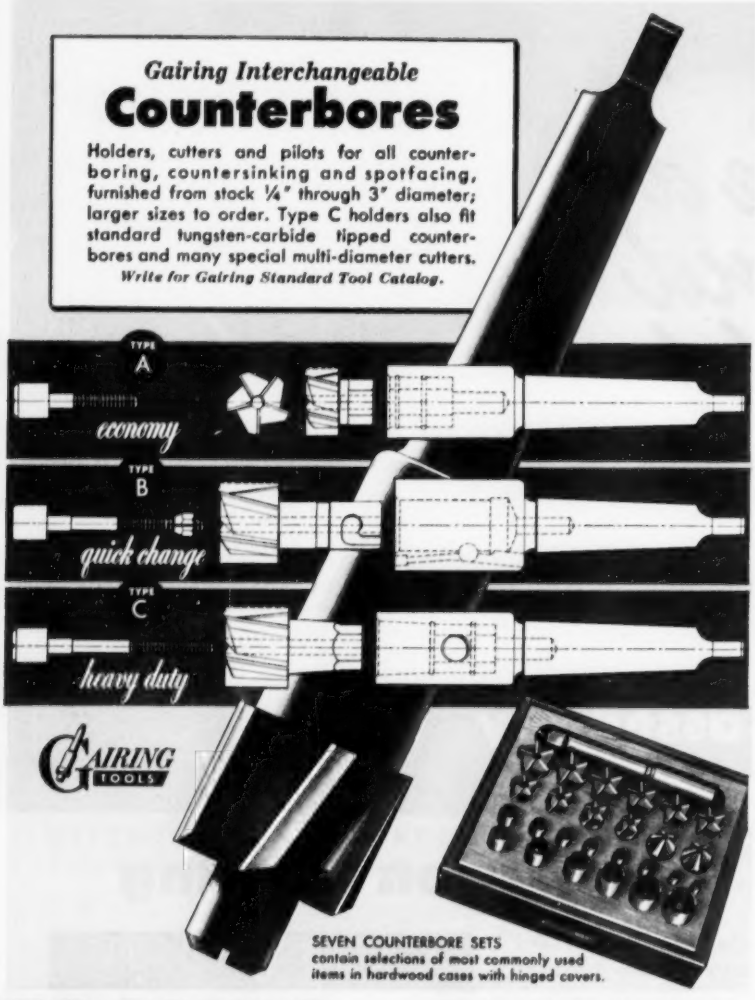
Gairing Interchangeable

Counterbores

Holders, cutters and pilots for all counterboring, countersinking and spotfacing, furnished from stock ¼" through 3" diameter; larger sizes to order. Type C holders also fit standard tungsten-carbide tipped counterbores and many special multi-diameter cutters.

Write for Gairing Standard Tool Catalog.



SEVEN COUNTERBORE SETS contain selections of most commonly used items in hardwood cases with hinged covers.

TOOLING by GAIRING

Although we at GAIRING like to prove to you our ability to design and produce special production tooling, don't come to us for the tough jobs only • The counterbores shown here, with various holders, the standard back spotfacers and core drills, are real quality production tools made by us for 35 years. Better write us today for the GAIRING Standard Tool Catalog and Price List.

In Canada: A. C. Wickman (Canada) Ltd., Queensway, Toronto 14

The GAIRING TOOL COMPANY • 21226 Hoover Road • Detroit 32, Michigan

From the *American Machinist* Library of *Tips for Top Shop Men*

BE sure you are modernizing a *job*, not just a machine. A new piece of equipment never gets a fair chance if units ahead and after it are still ancient klonkers and if feeding and workhandling devices are inadequate.

IF your plant is still departmentalized, study the advantages of straight-line rearrangement. Handling is usually too expensive nowadays to justify the luxury of having each type of machine tool segregated. The same goes for heat treating, cleaning and assembly.

Microstructure determines tool life . . .

U. S. AIR FORCE MACHINABILITY REPORT 1951

This *American Machinist* Special Report summarizes recently released data from the $100,000 machinability-research project conducted by Curtiss-Wright and other companies for the United States Air Force.

You will find particularly valuable, as a key to estimating the tool life cutting speed of any steel, this report's comprehensive chart of 12 steel structures under four metallurgical conditions.

Copies of this 8-page Special Report, which includes information on machinability as influenced by heat-treating and alloying, are available at 15 cents each.

Write for an editorial reprint order form listing titles and costs of other informative Special Reports.

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New Idea . . .

IN TESTING CASTINGS FOR LEAKS

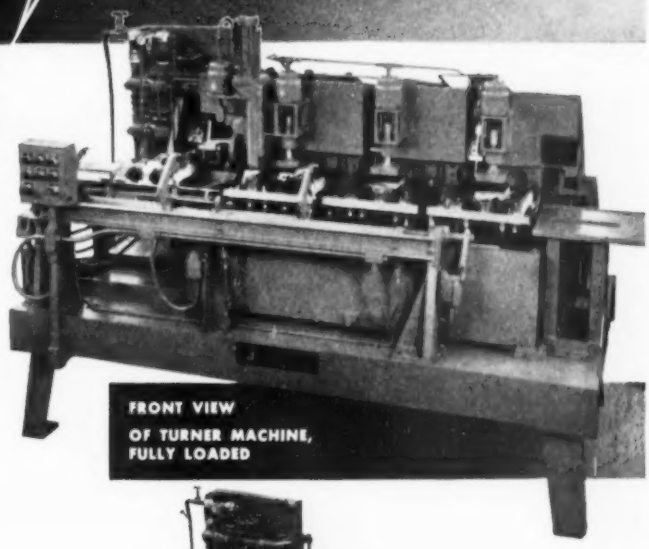
TURNER MACHINE PRESSURE TESTS AND ISOLATES THE LEAK AUTOMATICALLY!

Designed to leak-test manifold castings, or any other type of leak-proof castings.

The Turner machine illustrated checks simultaneously at separate stations:

1. **Water connections and heating cavity.**
2. **Lower sections of intake cavities.**
3. **Upper section of intake cavity.**

And, any leak is isolated automatically! That's the big advantage over pressure gauge testers!



FRONT VIEW
OF TURNER MACHINE, FULLY LOADED

DOWN VIEW
SHOWS MANIFOLDS SUBMERGED IN 90 GAL. TANK

REAR VIEW
SHOWING GAUGE. AIR IS INTRODUCED AT 40 LBS. PRESSURE

Specially designed to save manpower as well as accurately test for casting leaks, the Turner machine performs each step automatically. The manifolds are picked up from the automation station, brought into loading position, then transferred to each testing station. When parts are in position in the fixtures, the machine clamps them into place and seals all openings. By means of air cylinders, the parts are then dropped into a 90 gal. water tank, deep enough to completely cover the parts. Remaining submerged for about 15 seconds which allows the operator ample time to detect and mark any leak. The head then automatically comes back to its original position and the transfer mechanism picks up another part . . . at the same time ejecting the checked part onto the automation system.

More accurate, and even more economical than other methods of checking casting leaks, the new Turner machine can be adapted to any type or size of similar leak-testing application. It's designed to help save manpower, inspection time and floor space . . . while increasing production!

If you have a production assembly or inspection problem where you can use to advantage a special purpose machine, write today describing your problem. After our engineering department analyzes it, our field engineer will discuss it with you.

TURNER BROS. INC.
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FERNDALE 20, MICHIGAN

DESIGNERS and BUILDERS of:
- SPECIAL MACHINES
- JIGS and FIXTURES

FRAY VERSATILITY MOVES WORK FASTER!

Fray NO. 10RH

UNIVERSAL RAM • TURRET TYPE • VERTICAL & HORIZONTAL

MILLING MACHINE

Speed up production by cutting job transfers with the versatile Fray 10-RH. This all-purpose milling machine performs an unequalled range of operations, cuts idle machine time and produces more work per man hour. It machines at any angle—vertical, horizontal or both. It mills, drills or bores at any angle. On any single piece of precision work requiring a variety of operations it is easier to reset the Fray than to transfer the work. For faster jobs, done better at less cost—investigate the easy to operate Fray 10-RH. A High Precision Tool.

FRAY "ALL-ANGLE" HEAD TYPE 4

For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.

All-Angle

FRAY MACHINE TOOL CO.

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Clark ADJUSTABLE HOLE CUTTER

Finished cuts the first time in boiler plate, plastics, hard fibre, pipe, stainless steel, Transite, etc. 7 models cut variable expansions from ⅜" to 5" holes, with thickness capacities from thin sheets to 1".

SPECIFICATIONS

MODEL NO.	SHANK SIZE	EXPANSION CAPACITY	THICKNESS CAPACITY
00	⅜" SS	⅜"–1⅛"	1/16"
0	⅜" SS	⅜"–1½"	⅛"
1	½" SS	1"–2½"	⅛"
2	2 MT	1½"–3"	⅛"
3	2 MT	2"–3½"	5/16"
4	4 MT	2½"–4"	⅜"
5	4 MT	3"–5"	1"

For Complete Information Call Your Clark Cutter Jobber or Write Factory A

CLARK CUTTERS

Robert H. Clark Company

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How to estimate the time element in any machining job

Use this manual to make the winning but safe bids that mean more jobs and better profits for your shop.

Machine Shop Estimating

BY W. A. NORDHOFF

Douglas Aircraft Company, Inc.

488 pages, 488 illus., $7.00

Here's the kind of on-the-job help you need to make quick, reliable estimates of the time it takes to do the different machining operations in any machine-shop, large or small. Whether a job involves drilling, boring, tapping, threading, grinding—or any of the scores of other operations—this handy manual tells you exactly what to consider in estimating job-time.

It covers every step—from setting up a job, to tearing it down—giving the specific time value established for each element. The various non-machining operations which enter into the cost of any job are also given. Instructions are provided for the use of several methods of estimating particular jobs on each type of machine in use today.

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This offer applies to U.S. only.

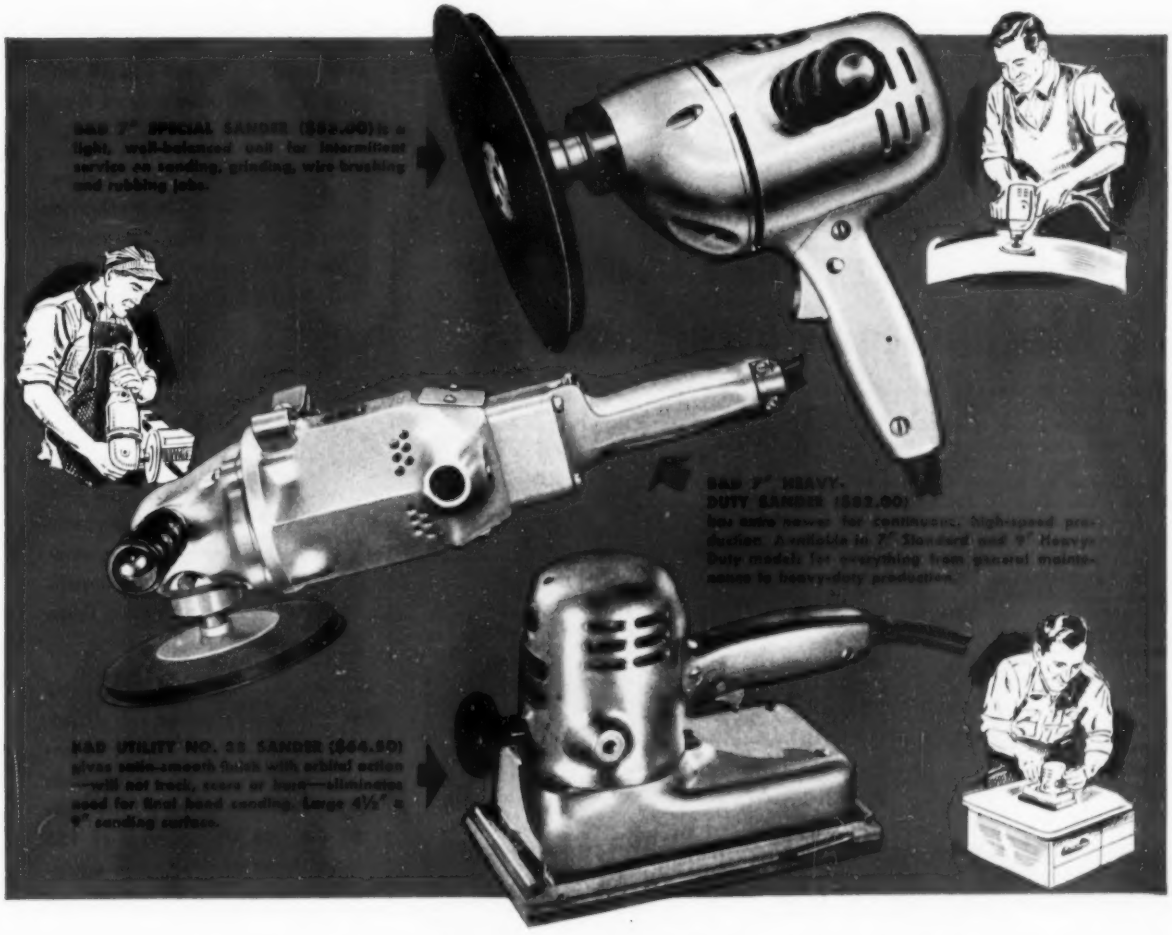
From the *American Machinist* Library of *Tips for Top Shop Men*

DON'T underestimate the effect of an unsound sales budget on production efficiency. Inaccurate forecasts mean fluctuating schedules, a changing work force, and low worker morale.

ARE you lugging materials to and from a machine for a minor operation that should be done where the material is? Check facing to length, centering, cut off, plain grinding. If volume is large, it may be cheaper to move the machine once and for all rather than moving the material continuously.

From fast material removal to satin-smooth finishing . . .

Speed up your surfacing jobs with Black & Decker Sanders!



Powerful, versatile, perfectly balanced!

WHETHER you're surfacing metal, wood or compositions . . . in production, construction or maintenance . . . Black & Decker Sanders are the tools for you! You have your choice of *four* rotary models to drive abrasive discs, saucer grinding wheels, "Whirlwind" wire cup brushes, rotary gouging and planing heads . . . plus the new orbital model that gives a satin-smooth finish 10 times faster than by hand.

Whatever your choice, you get a powerful B&D-built motor, *custom-made* for the tool it drives . . . streamlined design and perfect balance for easier handling . . . and top-quality construction features for which Black & Decker is famous! Ask for a demonstration at your favorite Black & Decker outlet. Write today for detailed literature to: THE BLACK & DECKER MFG. CO., 604 Pennsylvania Avenue, Towson 4, Maryland.

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. . . use them to save time, trouble, money!

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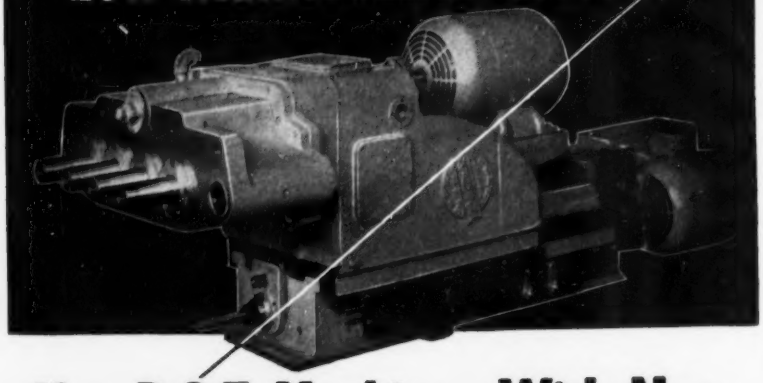
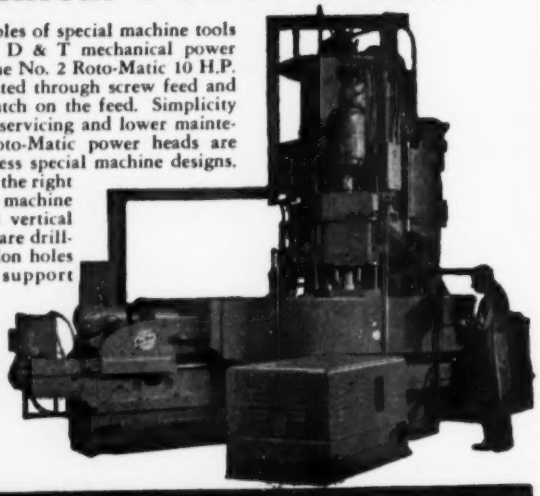
For High Production and Low Maintenance Costs *



Use D&T Machines With New Mechanical Power Heads

Here are two good examples of special machine tools designed and built with D & T mechanical power heads. Shown above, is the No. 2 Roto-Matic 10 H.P. head. All sizes are operated through screw feed and have overload release clutch on the feed. Simplicity of design makes for less servicing and lower maintenance costs. D & T Roto-Matic power heads are readily adapted to countless special machine designs. For instance: Machine to the right is a 6 station indexing machine with 3 horizontal and 3 vertical power heads. Operations are drilling and reaming suspension holes and king pin holes in support arms for power heads.



Free Data

is available on the complete line of D & T machines. Ask for Bulletin 1000.

DAVIS and THOMPSON Roto-Matic

Davis & Thompson Company

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GRANT

RIVETERS — PIONEERS in their line—head rivets from smallest to ¾" diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—Sizes to meet all needs—Types include Vertical and Horizontal Multiple Spindles.

Write for literature and don't forget to send samples.

THE GRANT MFG. & MACHINE CO.

85 Silliman Ave., Bridgeport, Conn., U. S. A.

How efficient is YOUR shop?

Over 42 per cent of metalworking production equipment is now over ten years of age . . . 19 per cent of it was bought more than 20 years ago!

This means that there is more over-age and obsolete production equipment operating in metalworking shops now than in 1945, and the rate of obsolescence is growing.

How about your shop? Are you equipped adequately with the modern, high-efficiency machinery and equipment which alone can produce the better products that cost *less to buy* which everybody wants? How does your shop compare with those of your competitors, and with metalworking shops generally?

You can find out quickly by writing for a copy of the *American Machinist* Mid-Century Inventory of Metalworking Production Equipment. Here are all the facts on the age and number of 155 major types of production equipment, operating in 15 manufacturing divisions and 25 major production areas. Price: $2.00 per copy.

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McGRAW-HILL BUILDING
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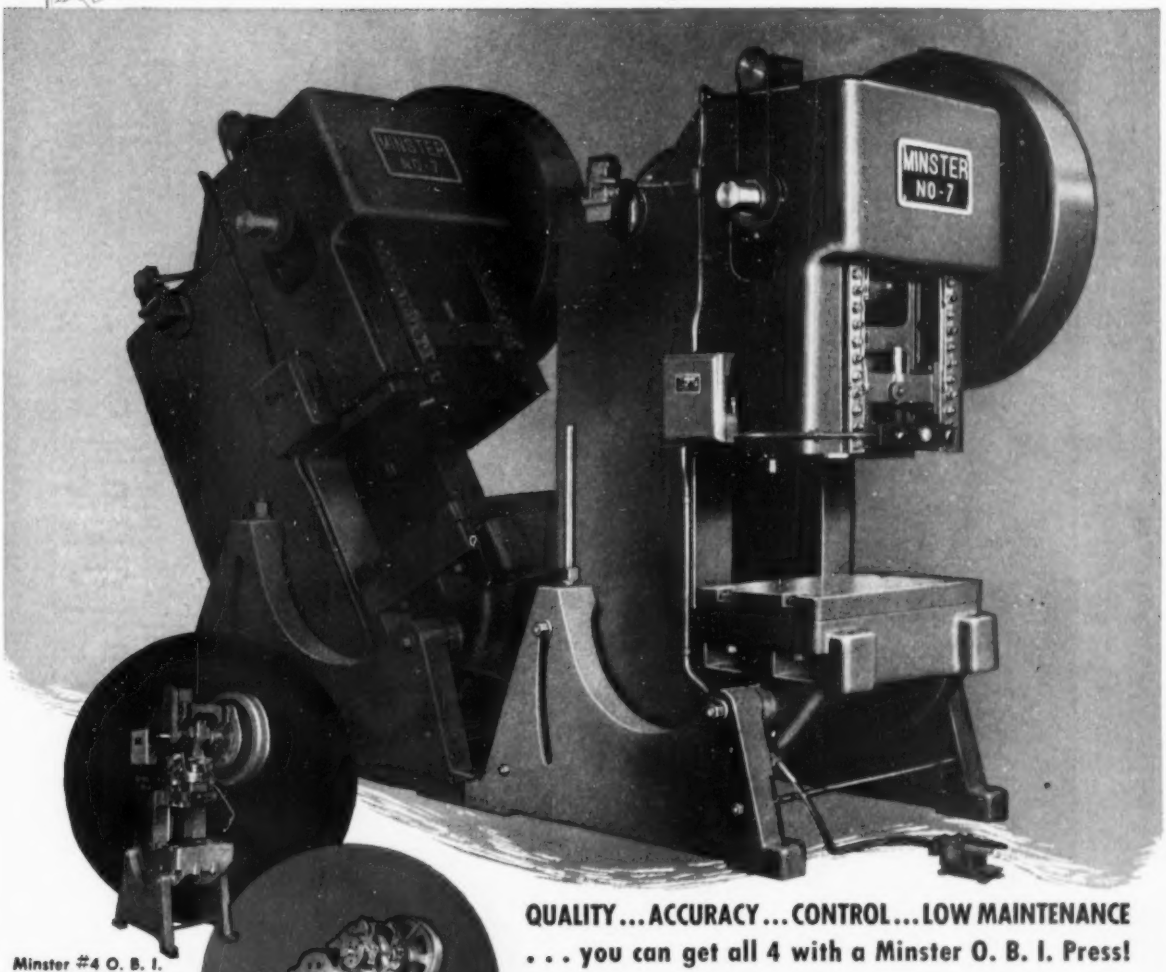
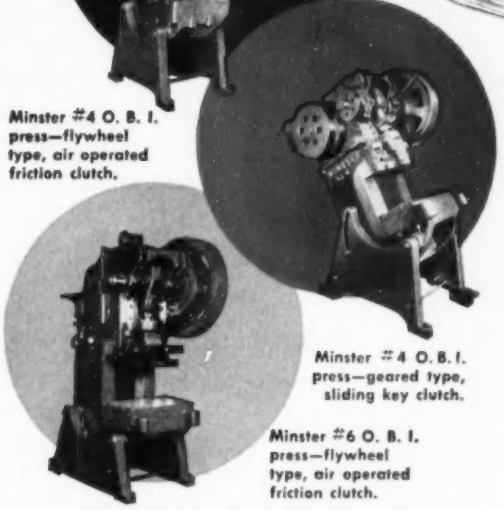
O.B.I. design at its best





Minster #4 O. B. I. press—flywheel type, air operated friction clutch.

Minster #4 O. B. I. press—geared type, sliding key clutch.

Minster #6 O. B. I. press—flywheel type, air operated friction clutch.

QUALITY... ACCURACY... CONTROL... LOW MAINTENANCE

. . . you can get all 4 with a Minster O. B. I. Press!

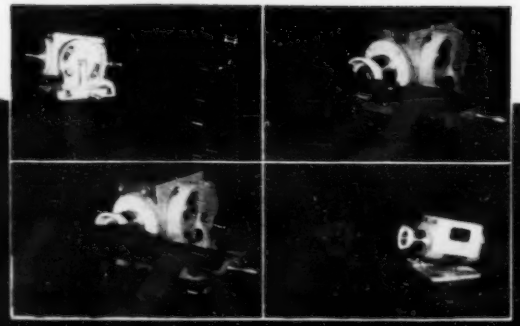
A big surprise awaits you if you haven't recently checked the Minster line of inclinable presses.

Are you interested in a production tool of outstanding quality in design and workmanship? Would you like to get high production with a high degree of accuracy? Does close control for long die life appeal to you? Are you looking for an inclinable that has an amazing record for low maintenance? Name it . . . Minster can give it to you.

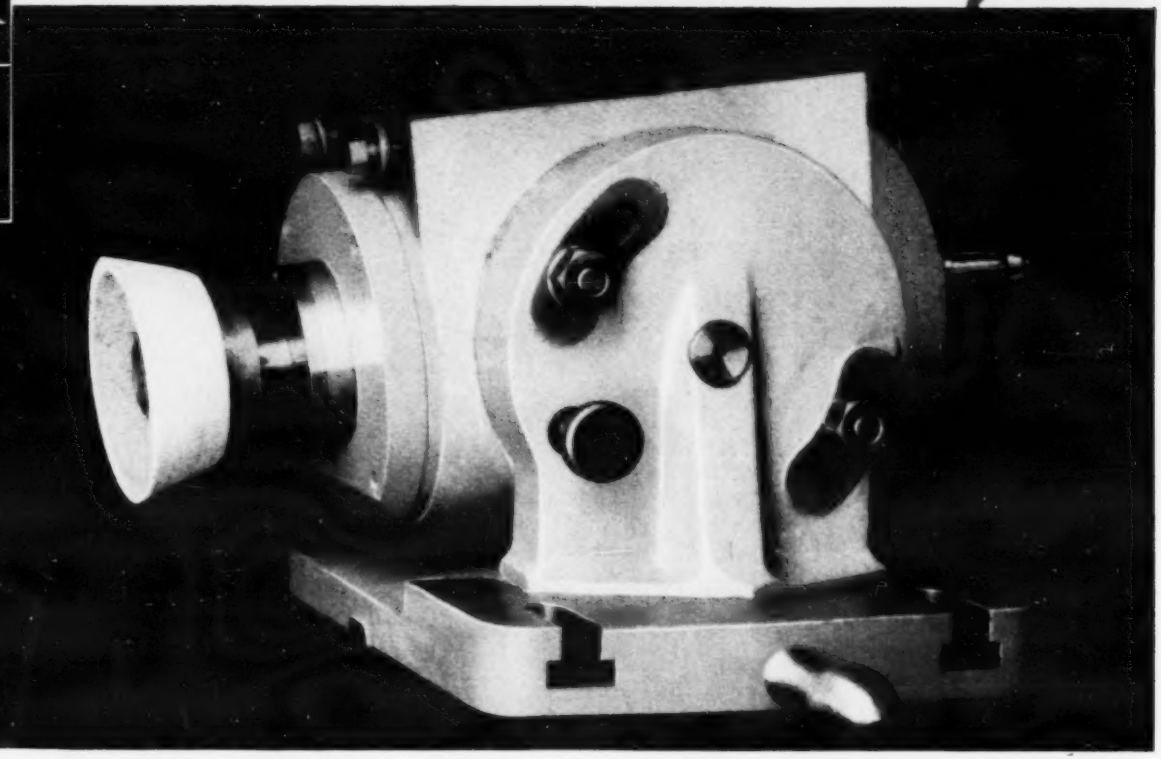
Get the Minster O. B. I. story. Contact our representative for additional information.

THE MINSTER MACHINE CO., MINSTER, OHIO

MINSTER
FIRST IN Press DESIGN



The TOOL GRINDER For *You!*



The Modern POPE Super Precision 1 HP, 3600 RPM Motorized Tool and Cutter Grinder Head With

Angular Adjustment

In A Vertical Plane

This new unit is super-precision throughout . . . It is designed particularly for replacement of tool grinder heads which do not have the extremely useful angular adjustment in a vertical plane.

It will more than pay for itself — reduces set-up time — makes wheels cut faster — spark out quicker — produces the kind of cutting edge on your tools that stands up and cuts longer.

Pope Motorized Grinder Heads are available for most makes of cutter and tool grinders. Ask for quotation to cover *your* grinder.

No. 92

Specify **POPE** PRECISION SPINDLES

POPE MACHINERY CORPORATION

Established 1920

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Do you have any problems due to wear, abrasion or corrosion of metal parts?

Electrolizing

CAN PROVIDE THE SOLUTION!

Hundreds of manufacturers in every field from home appliances to military equipment . . . wherever the resistance of metal to wear, abrasion or corrosion is important . . . are specifying Electrolizing.

A CASE IN POINT:

A major pump manufacturer was asked to produce a booster pump to be used on certain army aircraft. The specification called for a 15-hour dry run without galling. After every known surface treatment failed within 10 hours, it was suggested that they try Electrolizing. Electrolized shafts ran 55 hours with no signs of galling. After repetitive model and field tests Electrolizing was specified for the job.

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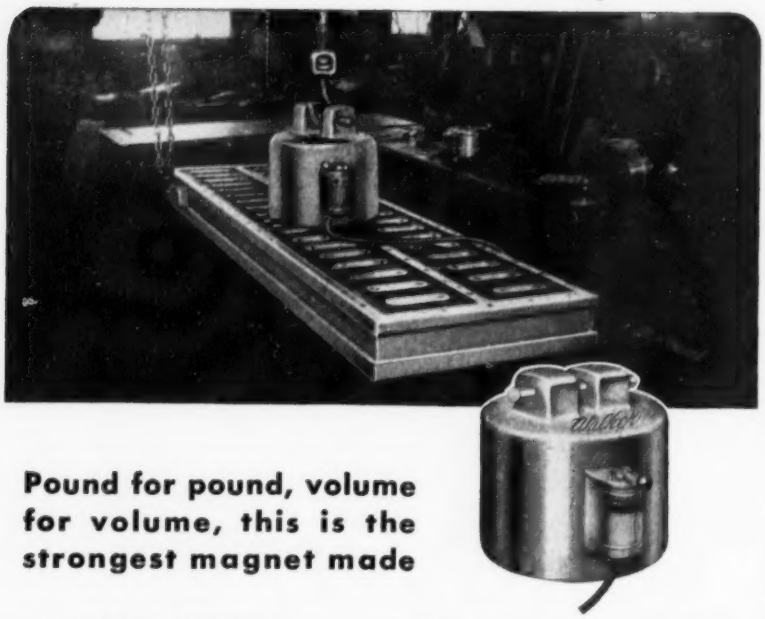

Pound for pound, volume for volume, this is the strongest magnet made

WALKER MAGNETS—The utilization of magnetic force under the most efficient conditions is the outcome of Walker's more than fifty years of research and development. . . . The 12" diameter Walker lifting magnet shown holds work up to 3000 pounds.

The Walker material is high in permeability and magnetized to complete saturation with equal flux distribution. . . . The Walker line includes contoured lifting magnets increasing the area of contact for special applications (for wire, pipe, etc.)

Original Designers and Builders of Magnetic Chucks

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In Canada—**UPTON BRADEEN & JAMES, LTD.**

From the *American Machinist* Library of *Tips for Top Shop Men*

ONE old-time shop manager, taking over from a tough and unapproachable predecessor, changed the atmosphere completely by saying: "When you have a problem, come in and see me. There's no frost on my doorknob!"

THERE'S always a way. Remember the college that got a bequest of several hundred thousand dollars for a new girls' dormitory — which the will stipuated must be surrounded by a 20-ft wall. A smart trustee suggested the bequest be accepted and the dorm be built—with the wall in a 20-ft trench.

How to Work Clad Materials

Proper application of clad materials can cut costs and save scarce metal. Output of clad materials has more than doubled since 1946 . . . has climbed to more than 23,000 tons per year and may reach 1,000,000 tons by 1960. Clad materials offer advantages that may well have profit-wise applications in your business.

Clad materials are not difficult to work, require only care and routine experience. "How to Work Clad Materials," an *American Machinist* Special Editorial Report, contains all the latest facts on how to work clad materials most efficiently and profitably. This 16-page report, complete with informative drawings, diagrams, and photographs, is still available for only 25¢ a copy. Write to Reader Service Department:

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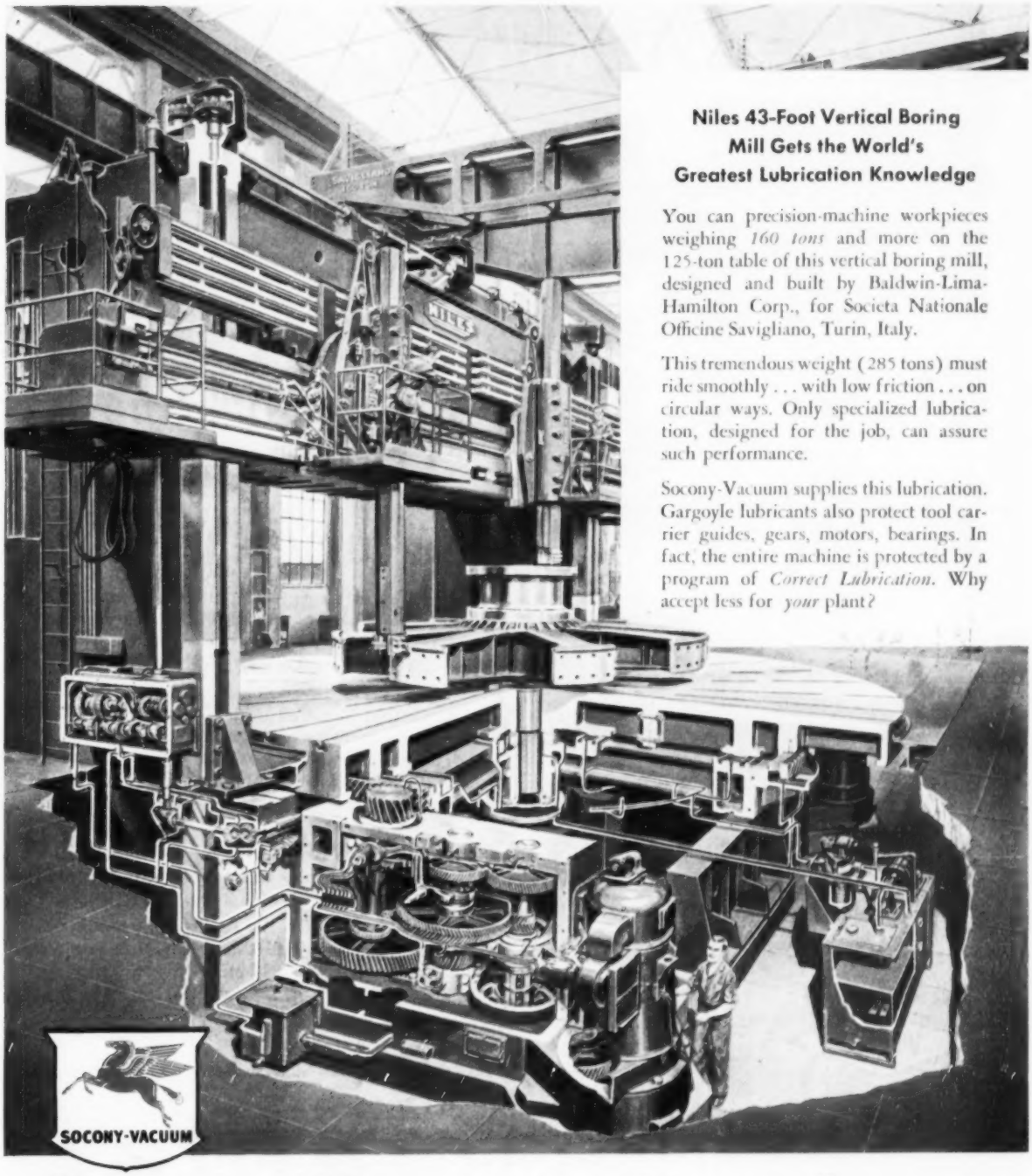
"Operating Table"
FOR 160-TON GIANTS!



Niles 43-Foot Vertical Boring Mill Gets the World's Greatest Lubrication Knowledge

You can precision-machine workpieces weighing *160 tons* and more on the 125-ton table of this vertical boring mill, designed and built by Baldwin-Lima-Hamilton Corp., for Societa Nationale Officine Savigliano, Turin, Italy.

This tremendous weight (285 tons) must ride smoothly . . . with low friction . . . on circular ways. Only specialized lubrication, designed for the job, can assure such performance.

Socony-Vacuum supplies this lubrication. Gargoyle lubricants also protect tool carrier guides, gears, motors, bearings. In fact, the entire machine is protected by a program of *Correct Lubrication*. Why accept less for *your* plant?

Socony-Vacuum *Correct Lubrication*

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

from the W&B Complete Line

Hercules High Speed Drills are specifically designed to provide you with more efficient drilling of steel castings, steel forgings, and heat-treated steel.

These drills are made from grooved bar-stock that is rolled under closely controlled temperatures to our exacting specifications. These stringent "specs" provide drill stock that has uniform grain-structure and cross-section practically unobtainable by other methods.

In forming the drill flutes from this grooved bar-stock, a hot twisting process further adds to the texture of the steel and preserves the natural grain-structure.

Note the heavy web design of these drills, it also contributes to the unusual strength and durability that enables Hercules High Speed Drills to withstand greater torsion.

It will pay you in faster drilling and longer drill life to select Hercules High Speed Drills for cutting all grades of steel.

New W & B Drill Catalog Now Available—Send for your free copy today.

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COUNTERBORES
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CARBIDE TOOLS
TOOL BITS
SPECIAL TOOLS

Contact Your Local W & B Distributor

"Makers of Fine Tools Since 1848"

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One-Stop shopping

for brass rod and bar

You can get rod or drawn bar of Chase Free-Cutting Brass, Copper or a wide variety of other copper alloys at one stop – *the Chase Warehouse nearest you!*

When you want free-cutting materials, it pays to buy Chase – for Chase rod and drawn bar yield the shorter chips that make for *easier machining, longer tool life.* They produce smooth, clean-surfaced products – less expensive to buff or polish before lacquering, enameling or plating.

And when it comes to re-ordering, remember that Chase alloys are uniform – repeat orders of the same alloy always have the same cutting characteristics.

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Eclipse-Pioneer* triples balancing output of air-pump rotors with TREBEL BALANCER

Rough balancing increased from 3.1 to 9.6 per hour
Fine balancing increased from 3.15 to 13.1 per hour

*Division of Bendix Aviation Corporation

Locate unbalance in your rotating parts this fast, simple way

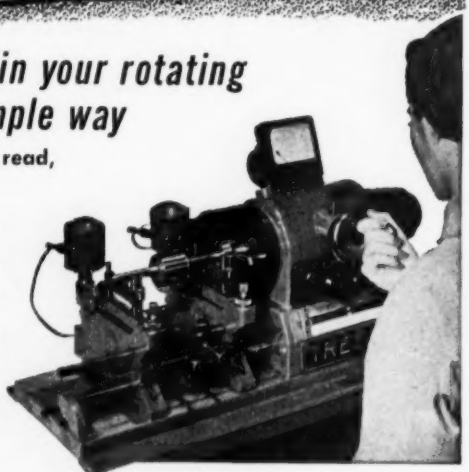
Takes less than a minute to read, 2 minutes to set up.

No special skills are needed to detect the *unbalance* that causes *vibration* in rotating parts . . . when you use the TREBEL DYNAMIC BALANCER.

The unique TREBEL dynamic balancing principle applies a variable counter-vibration to counteract unbalance vibration. Direct readings in ounce-inches give the *amount* of unbalance without further calibration; readings in degrees show *location* of unbalance.

That's why so many leading plants use the TREBEL.

Write for Catalog "A" or see a demonstration in your own plant.



Model 2b5 Trebel Balancer
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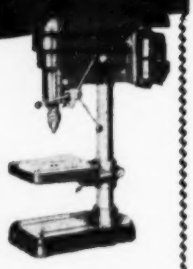

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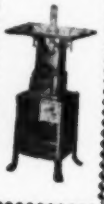

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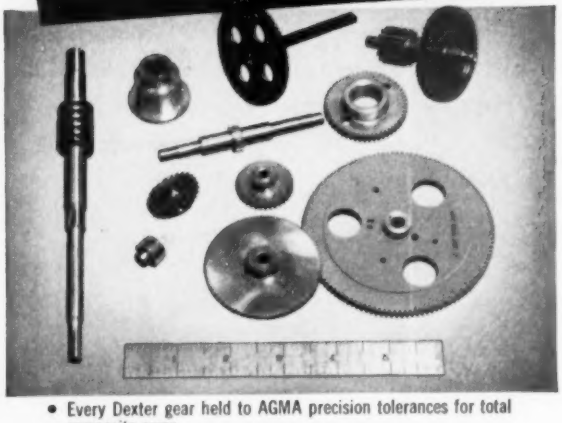

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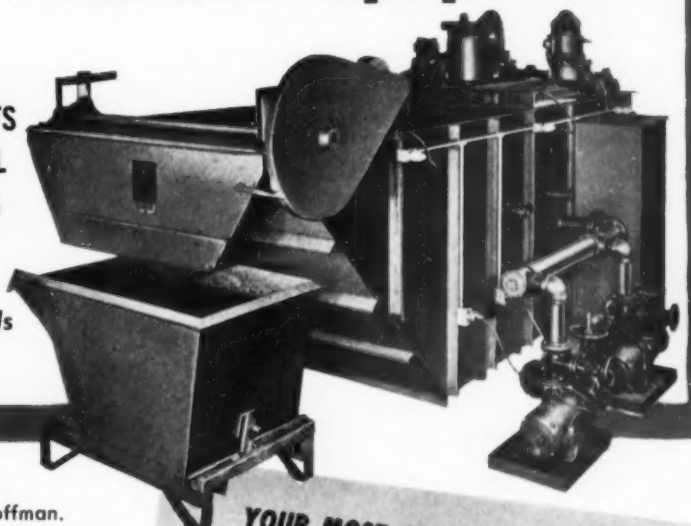

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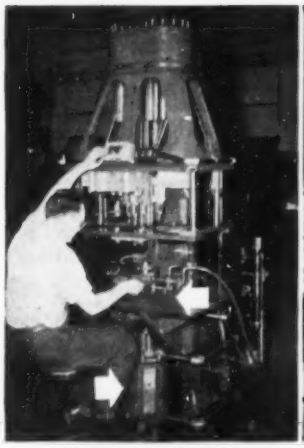

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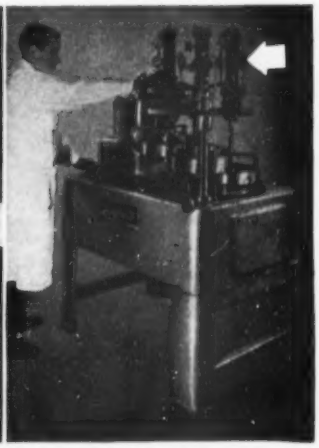

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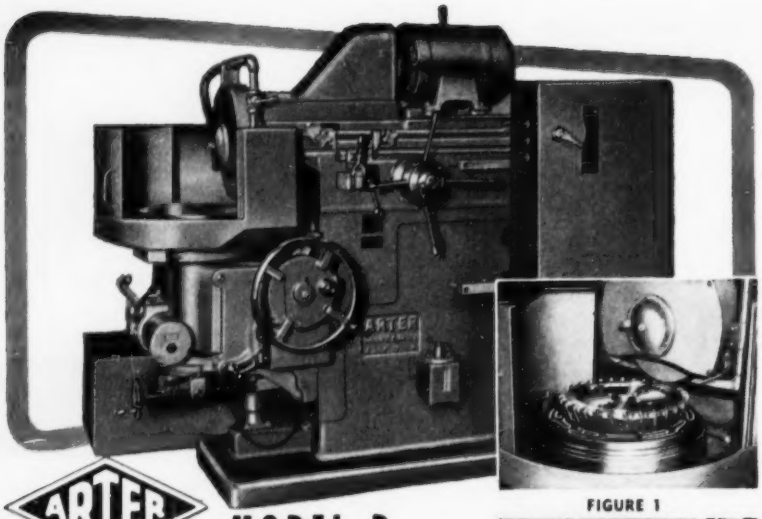

FIGURE 1

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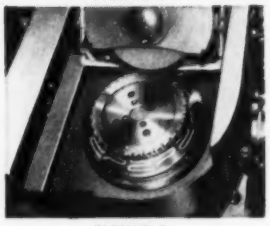

FIGURE 2

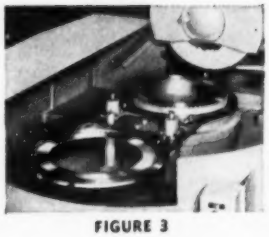

FIGURE 3

FIGURE 1—Inserted carbide tooth milling cutters ground on standard machine.

FIGURE 2—Machine built especially for grinding 45° angles on cutters.

FIGURE 3—Special Model D grinds by plunge cutting; work fed automatically up to non-oscillating grinding wheel.

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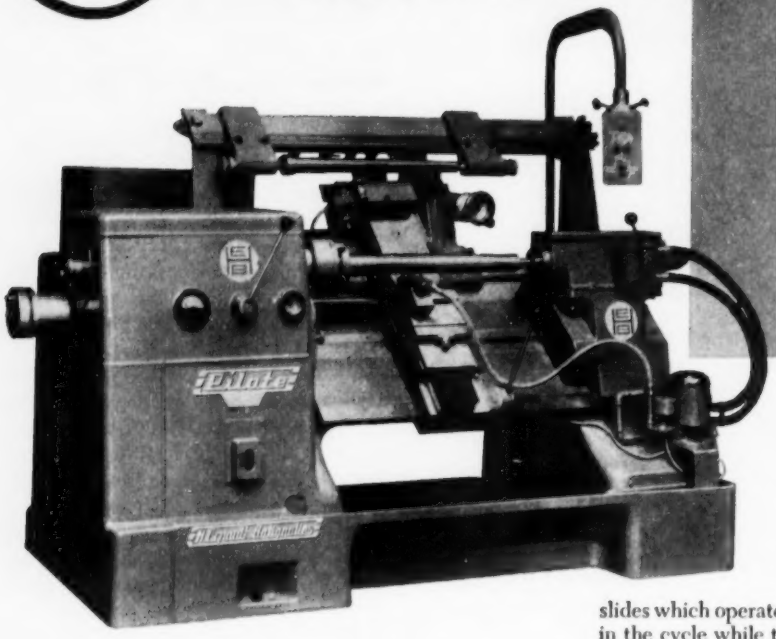

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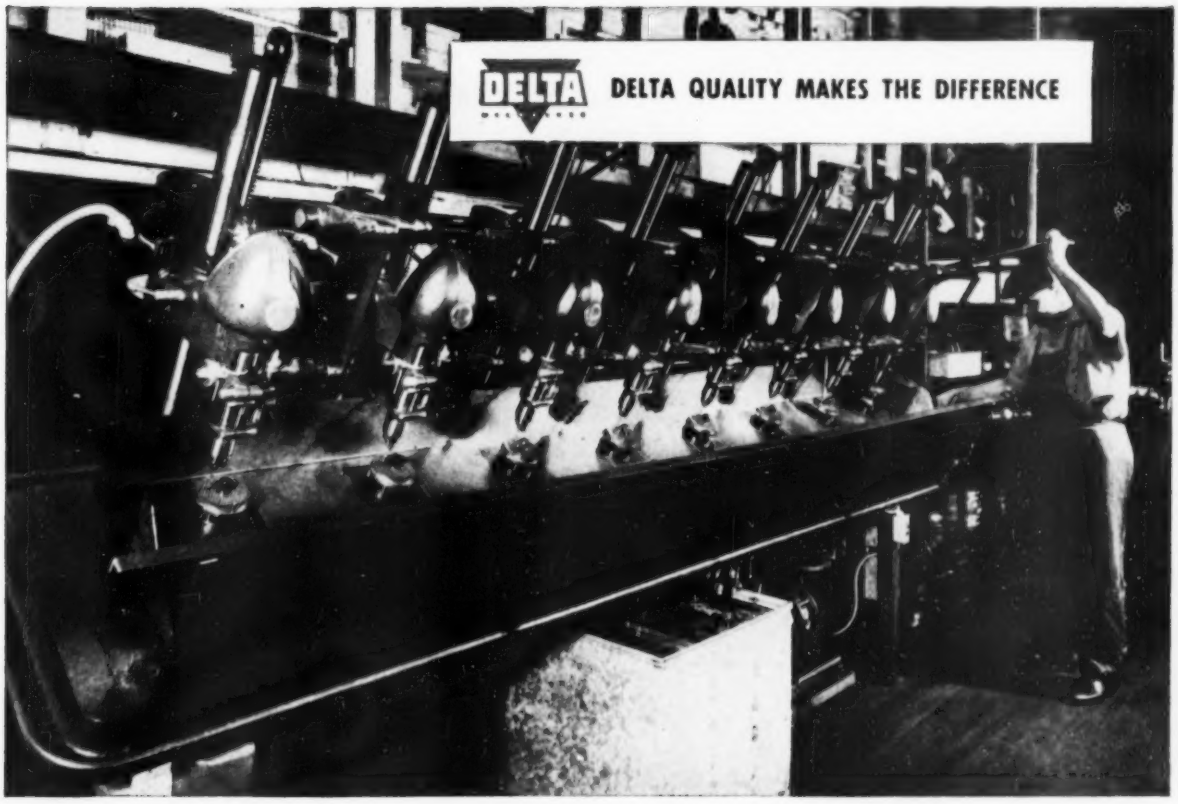

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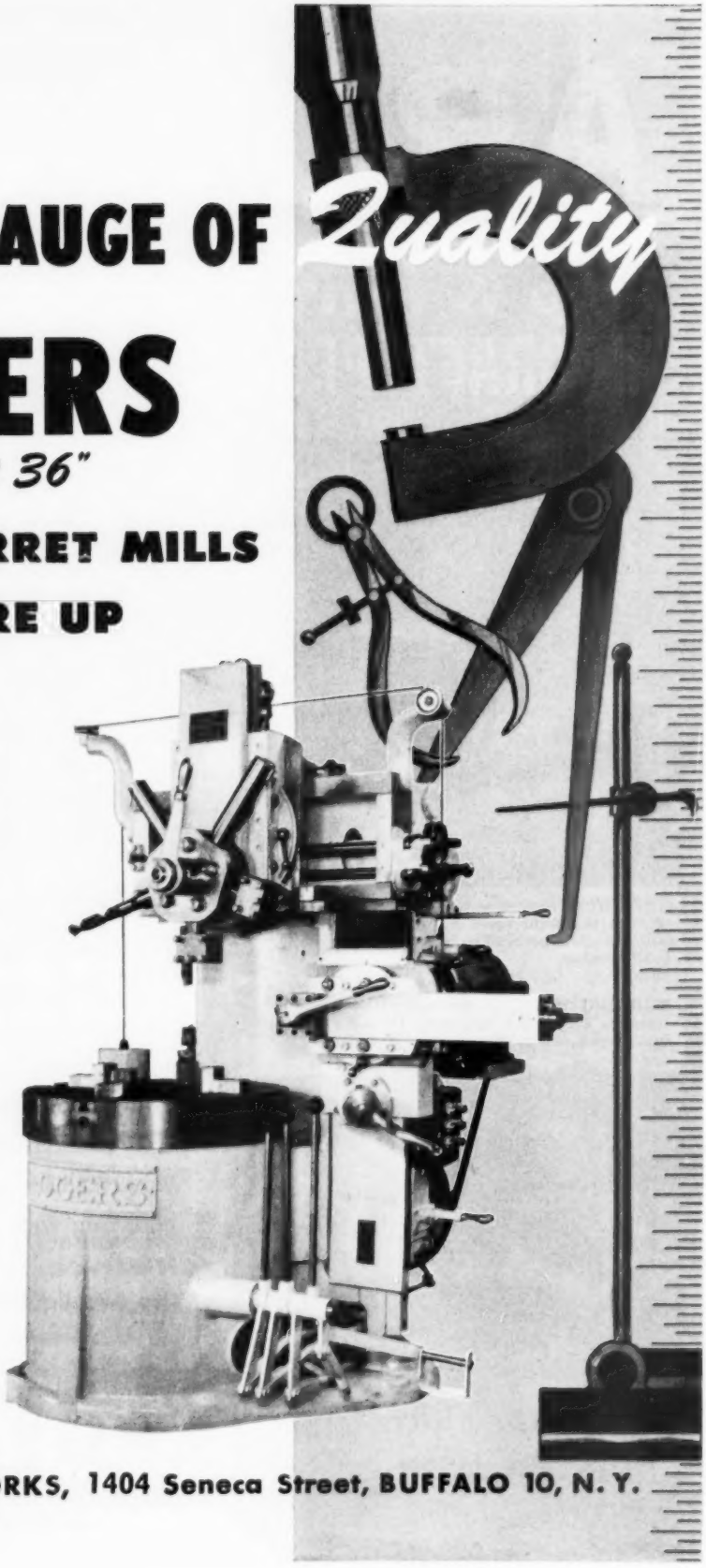

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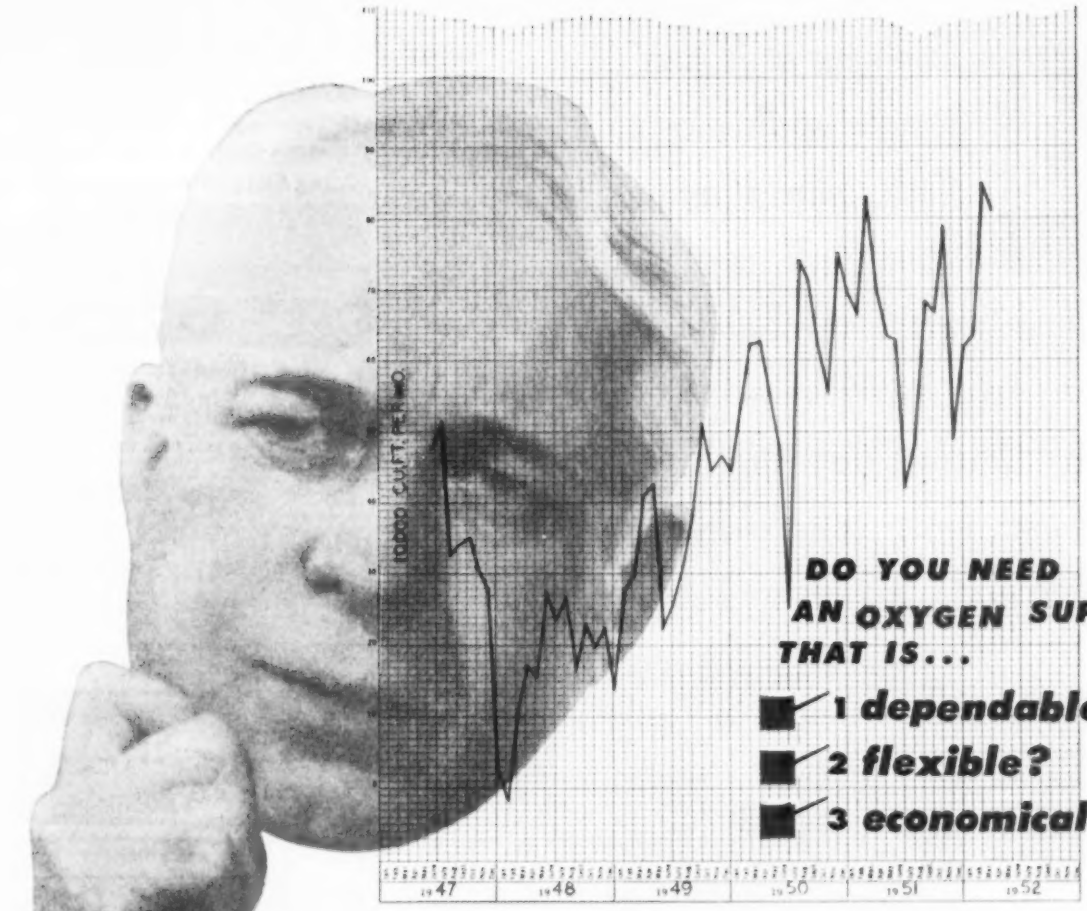
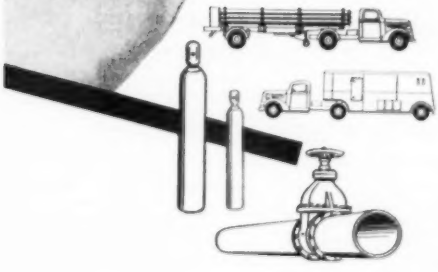
KNOWING HOW SINCE 1885



DO YOU NEED AN OXYGEN SUPPLY THAT IS...

- 1 dependable?
- 2 flexible?
- 3 economical?



1 If a complete or partial failure in your high-purity oxygen supply would hurt your production – you need a *dependable* supply. Airco can meet your demands for high-purity oxygen when and where you need it. Our vast network of plants in industrial areas is backed by adequate storage facilities, and a fleet of oxygen delivery trucks.

2 If your oxygen consumption varies like the typical example shown – you certainly need a *flexible* supply. You can meet peak requirements without the cost of extensive storage facilities – yet pay only for the exact amount you need when the demand lightens, without the many costs of idle capacity – by buying Airco oxygen.

3 No matter how much oxygen you use – you want an *economical* supply. Airco oxygen of a uniform high-purity is produced in volume for a nation-wide market – to give you, the individual user, low cost.

Call or write your nearest Airco office for help in planning the most economical oxygen supply for your needs. Airco specialists can help you *use* oxygen most efficiently, too.

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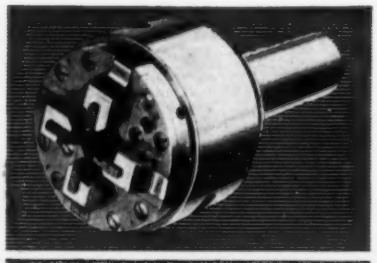
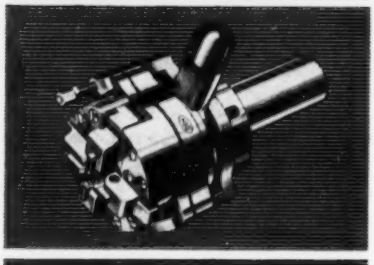
An IDLE man at a BUSY automatic spells PROFIT. ¶ A BUSY man at an IDLE machine spells LOSS. ¶ H&G Insert Chaser Die Heads are preferred by screw machine engineers because they spell less down time, lower costs, cleaner, more accurate threads. ¶

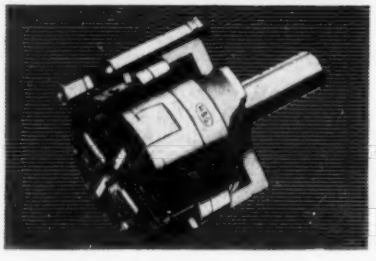
Style MM
for multiple spindle automatics, chucking machines, drill presses.



Style DMS
for hand screw machines, turret lathes, where die head does not rotate.



Style DM
for B & S automatics and small spindle machines.



H&G Insert Chaser DIE HEADS

WRITE FOR "HOW TO SELECT THE PROPER DIE HEAD FOR THE JOB".

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Grip work tightly for wet or dry grinding.
Supplied with connections for either 110 or 220 volts D.C.

5¾"x13" **$55.37**
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10¾"x37" **$280.00**

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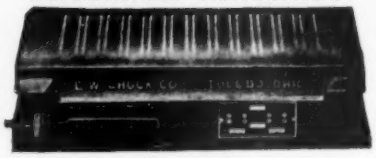

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A single pass over the stationary poles completely demagnetizes work. 110 volt A.C. Model B-2 for large work, 7¾" x 12½" x 6¾". Ship. wt. 55 lbs. **$73.45**

Model J-1 for small work, 7¼" x 7¼" x 6¼". Ship. wt. 35 lbs. **$47.83**

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A.C. input 110 volts, D.C. output 110 volts. P-1 for 5¾" x 13" chuck 0.8 amps **$45.04**

P-2 for 6½" x 18" chuck 1.0 amps. **$52.30**

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For 5¾" x 13" and 6½" x 18" sizes **$10.35**

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Equally accurate as portable or stationary equipment.
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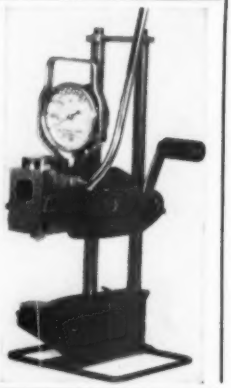
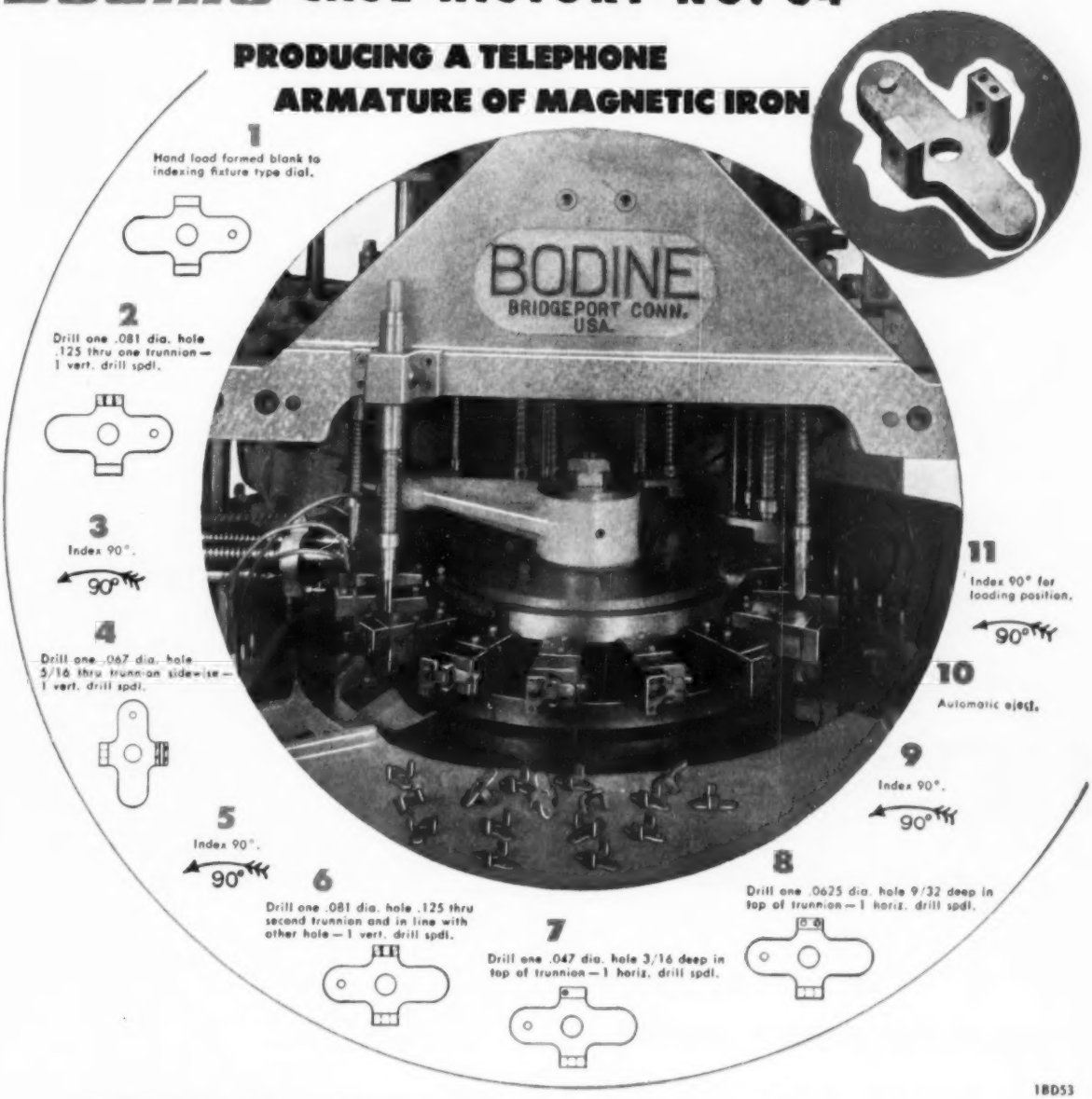


ANDREW KING
Box 606 J Ardmore, Pa.

Bodine CASE HISTORY NO. 34

PRODUCING A TELEPHONE ARMATURE OF MAGNETIC IRON


1
Hand load formed blank to indexing fixture type dial.
2
Drill one .081 dia. hole .125 thru one trunnion — 1 vert. drill spdl.
3
Index 90°.
90°
4
Drill one .067 dia. hole 5/16 thru trunnion sidewise — 1 vert. drill spdl.
5
Index 90°.
90°
6
Drill one .081 dia. hole .125 thru second trunnion and in line with other hole — 1 vert. drill spdl.
7
Drill one .047 dia. hole 3/16 deep in top of trunnion — 1 horiz. drill spdl.
8
Drill one .0625 dia. hole 9/32 deep in top of trunnion — 1 horiz. drill spdl.
9
Index 90°.
90°
10
Automatic eject.
11
Index 90° for loading position.
90°
BODINE
BRIDGEPORT CONN. USA.

1BD53

PRODUCTION: The Bodine 42-30 automatic horizontal dial type of machine (one of 6 standard sizes) is equipped with 5 drill spindles (3 vertical, 2 horizontal) and special fixtures which automatically index the work 90° four times during the cycle. Production: 500 pieces (2500 operations) per 50-minute hour at 10 strokes per minute.

ACCURACY: *Alignment of two .081 dia holes ±.002; other hole locations to within 010, hole diameters held to ±.002.*

WRITE FOR INFORMATION *on high-speed repetitive production with combinations of drilling, tapping, milling, screw inserting, staking, and assembly.*

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CORPORATION
BRIDGEPORT 5, CONNECTICUT

AUTOMATIC DIAL TYPE DRILLING, MILLING, TAPPING, AND SCREW INSERTING MACHINES

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Model U1—A sturdy, precision built machine for every grinding need in the tool room and laboratory. Ideal for cutters, mills, reamers; particularly suited for cylindrical, surface and internal grinding.

Table Size—35½"x5⅛"	Between Centers—27½"
Table Travel—16⅛"	Swing on Centers—11"
Cross Travel—8⅝"	Wheel Speeds—3000/6000 r.p.m.

The **Model U2** performs the same duties but in addition, grinds contour cutters from a template.

ATTACHMENTS for Heavy Duty Cylindrical, Internal, Radius, Long Reamers and Universal Hob Grinding.

ALL machines are equipped with graduations and electrical controls to fit American requirements. Service and Replacement parts for all machines.

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- Lubricants, Oils, Greases
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Every major aircraft now being assembled relies on the vibration-proof holding power of ELASTIC STOP nuts. Only ESNA manufactures a complete line of all types and sizes of self-locking nuts.

Rollpins

dia. from 1/16" to 1/2"

Rollpins are slotted, tubular steel, pressed-fit pins with chamfered ends. They drive easily into holes drilled to normal tolerances, compressing as driven. Extra assembly steps like hole reaming or peening are eliminated. Rollpins *lock* in place, yet are readily removed with a punch and may be reused.

Cut assembly costs by using Rollpins as set screws, positioning dowels, clevis or hinge pins. Specify them in place of straight, serrated, tapered or cotter type pins.

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Price Complete $1985 Delivery from Stock

Quick changeover from job-to-job on short or long run heavy-duty drilling production is assured by easily adjustable head and table on new ALFING DRILL PRESS.

Crank *raises* or *lowers* table; headstock moves 6" up or down by hand on scraped ways. Easy-to-reach controls cut handling time, too. 9" quill-supported spindle stroke, driven by 3½ h.p. V-belt motor. Motor speed 900 rpm. Drilling capacity of 1" in steel; 1¼" in cast iron. 8 spindle speeds from 150 to 1640 rpm. Drilling feed by hand or power.

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ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

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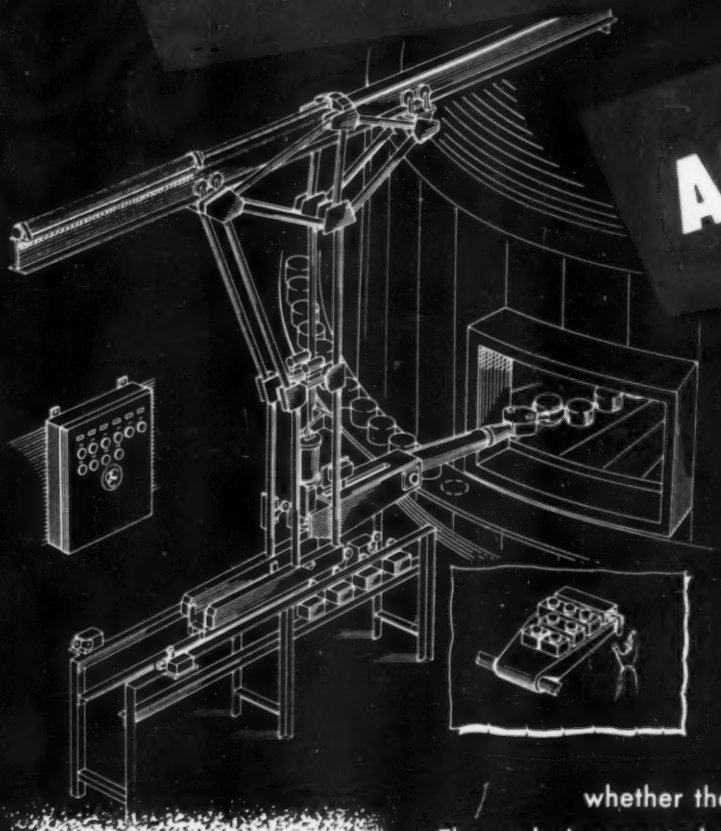
How's This For — AUTOMATION?

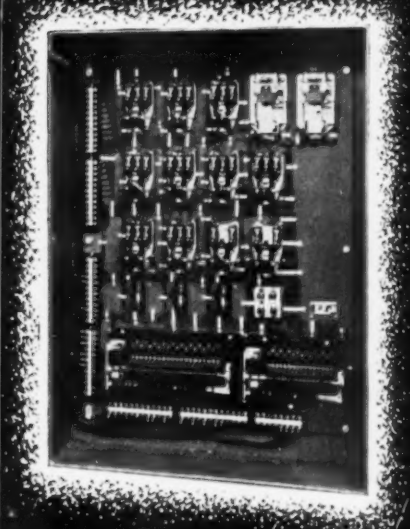


This mechanical hand is called a Billet Charging Machine. It automatically loads cylindrical steel billets into a rotary furnace, one row at a time, to be heated for forging.

The machine picks up a billet from the conveyor and sets it down inside the furnace. It repeats this operation until it has lined up a full row of billets. A selector switch determines whether there shall be three or four billets to a row. The cycle is repeated when the furnace rotates to the next loading position.

Seven separate motions are required to load each billet. Thus the complete cycle involves either 21 or 28 individually controlled motions for the row.

The Billet Charger was designed by E. Homer Kendall, Consulting Engineer, of Alliance, Ohio and built by May-Fran Engineering, Inc., of Cleveland. The special automatic control panel — the brain of the machine — is Clark designed and Clark built.



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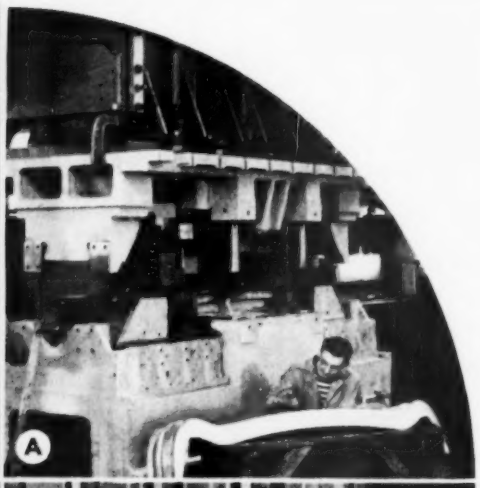
A COMPLETE SHEET METAL DIE SERVICE...



- *Iron die*
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- *Plastic die*

NEED a completely-accurate, experimental plastic die? A dependable, short-run zinc alloy die? Or a high-production iron die?

You'll find Allied to be the only plant in the country able to provide you *the complete service* which includes all three kinds.

The newest addition to the Allied circle, Rezolin Tool Plastik, is used to produce dies at a saving of initial cost and delivery time. These plastic dies are accurately made — can't shrink or expand. Where extra runs are demanded, Allite zinc alloy dies provide all the advantages of low-cost tooling. And, finally, for long production runs, Allied can build iron dies of any type or size.

Remember, too, that any of these materials — plastic, zinc alloy or iron — can be combined to give you maximum economy plus top performance. Write today for complete details.

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PLANT 2
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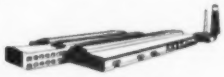
PLANT 3
Hillsdale, Mich.



PLANT 4
Hillsdale, Mich.

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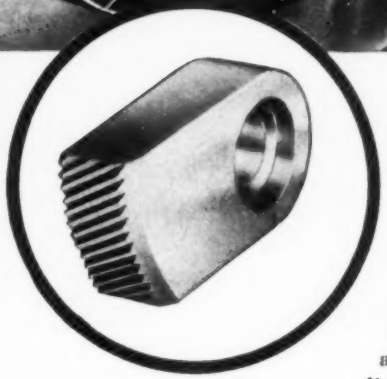
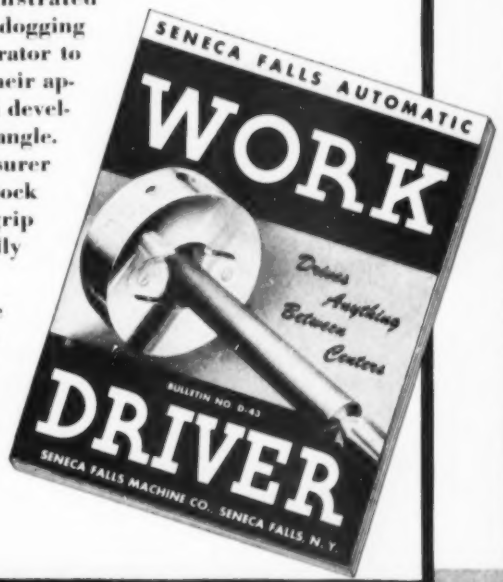
Automatic
WORK DRIVER
Drives Anything Between Centers



Jaws with angular serrations ... NOW STANDARD

● These self-centering, quick-acting Drivers have long demonstrated their ability to eliminate dogging time and to enable one operator to attend multiple machines. Their application has been widened with development of a new jaw having serrations milled at a suitable angle. These angular serrations provide an overlapping contact for surer and quicker grip on smooth finished, as well as hot rolled stock and forgings having a relatively hard surface. This positive grip eliminates slippage and resultant tool breakage . . . especially important when costly carbide tools are used.

Seneca Falls Work Drivers are designed for use on any engine or multiple-tool lathe and for certain work on turret lathes and grinding machines. In addition to time-saving, the Seneca Falls Automatic Work Driver provides greater safety for the operator since there are no projecting screws or sharp corners to catch clothing or injure hands. Made in 18 standardized models for work diameters ranging from ¼ to 6⅞ inches. Write for Bulletin D-43.



SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PYLE NATIONAL INCREASES PRODUCTION 47%!

Soldering Of Spring Assemblies Speeded By *LINDBERG* Induction Heating Unit

An hourly production increase of 47% . . and a per-operator production increase of 330% through the use of a Lindberg Induction Heating Unit! These are the money saving facts and figures reported by Pyle National Co., Chicago manufacturer of electrical components.

The company uses a 10 KW Lindberg unit for the production soldering of flanges to coil springs in the manufacture of torsion spring assemblies. The time cycle is 11 seconds for each assembly.

Production has been increased to 125 assemblies an hour . . with one girl operating the equipment. This is an hourly increase of 40 assemblies over the former method where soldering was done by a team of three men using gas torches. And the hourly per-operator production is up from 28 to 125!

With the induction heating unit, there are no open flames from gas torches. No extra exhaust fans are required . . there is little danger of burns to operators . . fire hazards are virtually eliminated!

And there is a substantial economy of floor space! Formerly the three torch operators required more than 60 square feet of floor space . . but the Lindberg Induction Heating Unit requires less than 30 square feet.

If your requirements call for production soldering, brazing, hardening, annealing, stress relieving, hot forming, forging or shrink fitting, investigate Lindberg Induction Heating Units. Ask for Bulletin 1440.

These parts . .
plus this ring of soft solder . .
go through the
Lindberg Induction Heating Unit
to make this
torsion spring assembly . .

LINDBERG

HIGH FREQUENCY DIVISION

LINDBERG ENGINEERING COMPANY,
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ANOTHER
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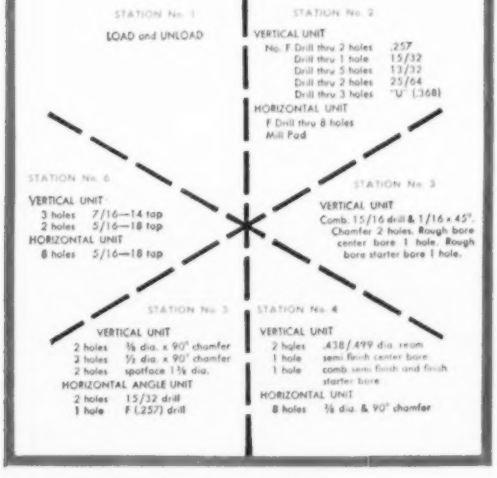
with a **BAKER** SPECIAL MACHINE

Baker Multi-Operation Machine utilizing standard Baker 7½ x 16 and 15 x 16 units and a 72" six-station power indexing table, performs drilling, chamfering, boring, counterboring, and tapping operations on clutch housings at the rate of 80 parts-per-hour at 100% efficiency.


STATION No. 1
LOAD and UNLOAD
STATION No. 2
VERTICAL UNIT
No. F Drill thru 2 holes .257
Drill thru 1 hole 15/32
Drill thru 5 holes 13/32
Drill thru 2 holes 25/64
Drill thru 3 holes "U" (.368)
HORIZONTAL UNIT
F Drill thru 8 holes
Mill Pad
STATION No. 3
VERTICAL UNIT
Comb. 15/16 drill & 1/16 x 45°. Chamfer 2 holes. Rough bore center bore 1 hole. Rough bore starter bore 1 hole.
STATION No. 4
VERTICAL UNIT
2 holes .438/.499 dia. ream
1 hole semi finish center bore
1 hole comb. semi finish and finish starter bore
HORIZONTAL UNIT
8 holes ⅛ dia. & 90° chamfer
STATION No. 5
VERTICAL UNIT
2 holes ⅛ dia. x 90° chamfer
2 holes ½ dia. x 90° chamfer
2 holes spotface 1⅛ dia.
HORIZONTAL ANGLE UNIT
2 holes 15/32 drill
1 hole F (.257) drill
STATION No. 6
VERTICAL UNIT
3 holes 7/16—14 tap
2 holes 5/16—18 tap
HORIZONTAL UNIT
8 holes 5/16—18 tap

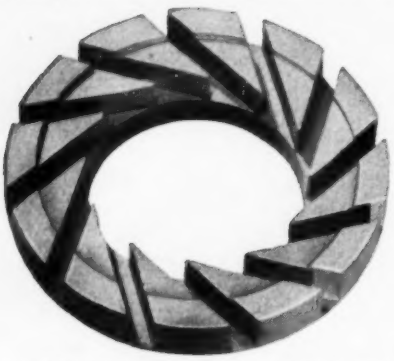
Baker Special Drilling Machines, composed of standard Baker units arranged to suit each individual problem, are designed for *productivity*. Units arranged in vertical, horizontal and angular planes perform multiple operations *faster . . .better . . . automatically* . . . with greater accuracy and efficiency. Consult Baker engineers for a better solution to your drilling problems.

. . SINCE 1867

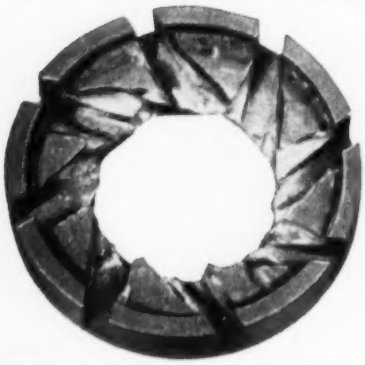
BAKER BROTHERS, INC. Toledo, Ohio

DRILLING . . . TAPPING . . . KEYSEATING and CONTOUR GRINDING MACHINES

This HAYNES STELLITE alloy part *lasted 12 times as long as* this alloy steel part



AFTER 1 YEAR'S SERVICE



AFTER 30 DAYS' SERVICE

Micronizer nozzle disks, machined from alloy steel, wore out in just 30 days when used for converting gas house tar into an ignited vapor in a steam generator unit. The abrasive particles in the fuel and the high velocity (39,000 ft. per min.) of the steam rapidly eroded the alloy steel parts to destruction. This same limited service was obtained from disks used in precipitating dust from the exhaust uptake of air-swept coal pulverizers in a power plant.

After considerable testing, investment-cast parts of HAYNES STELLITE alloy No. 19 were adopted as standard equipment. This hard cobalt-base alloy stands up for at least a year under the severe abrasion—outwears the alloy steel 12 to 1. The parts are produced so accurately by the investment casting process that finishing operations are cut to a minimum.

HAYNES precision casting is an ideal manufacturing method for parts that must be made from an alloy difficult to fabricate into intricate shapes by ordinary methods. For more information, write for the booklet, "Investment Castings."

HAYNES TRADE-MARK *alloys*

"Haynes" and "Haynes Stellite" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
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ASK **BAIRD** ABOUT IT!

HIGH PRODUCTION TOOLING

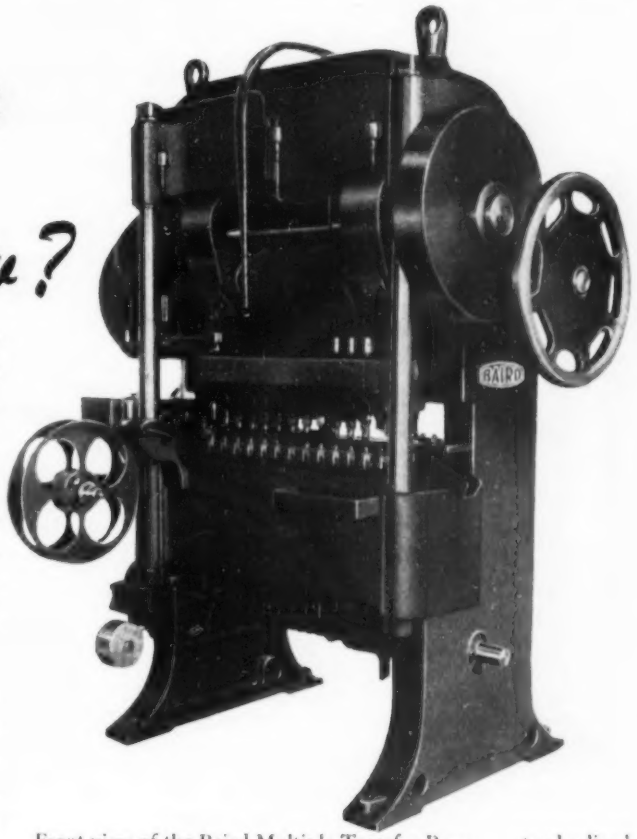
Biting off *More* than you can *Chew?*

Many types of small stamping machines can bite off coiled metal stock, but the BAIRD MULTIPLE TRANSFER PRESS cleverly chews each length into accurately formed products at the rate of thousands of pieces per hour.

Almost-human transfer fingers automatically grip and carry the work to progressive die stations where blanking, drawing, piercing, embossing, slitting, trimming, broaching, sizing, hexing, forming, etc., complete the piece.

Simply stated, the Transfer Press combines, in a single cycle, operations that otherwise might require several smaller machines with an operator for each. There are almost endless tooling possibilities . . . set-ups that turn out millions of small parts at extremely low cost.

An installation of Baird Multiple Transfer Presses puts the buyer in a most favorable competitive position in a buyer's market. Better "ask Baird about it!"



Front view of the Baird Multiple Transfer Press . . . standardized in 12 sizes with rated working pressures from 5 to 55 tons. Coiled stock from 2½" to 4" in width is automatically fed at high speeds.

SEND FOR TRANSFER PRESS BULLETIN

the **BAIRD MACHINE COMPANY**
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

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...No Change-over Time!

The DIVERSIMATIC gives you the facilities of *three* separate machines for the cost of *one!*

It's a standard centerless grinder for ordinary throughfeed work!

It's equipped with a Crush Forming Attachment for form grinding and profile work!

It's a standard centerless grinder for infeed jobs!

You can do any one of these three important jobs with practically no change-over time!

Your Crush Dresser is as handy as a lathe taper attachment... *it's there when you need it, out of the way when you don't... and it opens a whole new world to centerless grinding possibilities!*

If you grind externally consider DIVERSIMATIC ...equipped with the spindle that needs no warm-up!

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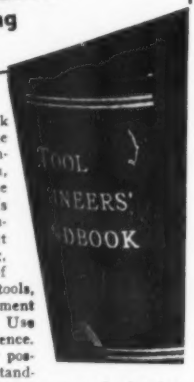
An outstanding reference on

PLANNING, CONTROL DESIGN, TOOLING and OPERATIONS

in the mechanical manufacturing industries



THIS handbook brings you the most modern, authoritative data on the design, fabrication, maintenance and economical use of tools and machinery used in industry. It covers product design and cost estimating, the economical selection of machines, processes, and tools, the analysis and improvement of setups and operations. Use it with complete confidence. Data are based wherever possible and practicable, on standards established by the government, professional associations and leading industrial companies.

TOOL ENGINEERS' HANDBOOK

American Society of Tool Engineers
Frank W. Wilson, Editor-in-Chief

Written by 144 authorities in the field, this massive reference, consisting of 115 big sections covering tool engineering from A to Z, has been checked and double checked from cover to cover to insure accuracy. Here are the complete, authoritative answers to your problems, brought to you in compact, easy-to-find form.

More than 2000 pages! Over 1500 illustrations! Hundreds of tables, charts, keyed diagrams, symbols, definitions, equations, etc.

A small selection of highlights selected at random to illustrate the scope of this Handbook:

- Describes types of machines, cutting tools, tool holders, fixtures and operations in precision production boring.
- Includes all new techniques and processes of recognized acceptance including Powder Metallurgy, Investment Casting, Plastic Joining of Materials, etc.
- Conventional tables of feeds, speeds and cuts modernized to bring them into line with latest cutting-tool materials and cutting practices.
- Treats, process-wise, such topics as Plaster Mold Casting, Superfinishing, Rotary Swaging, Sheet and strip cold roll forming, Die Hobbing, etc.
- Covers every phase of metal cutting and machinability.
- Discusses welding, gluing and mechanical joining of materials.

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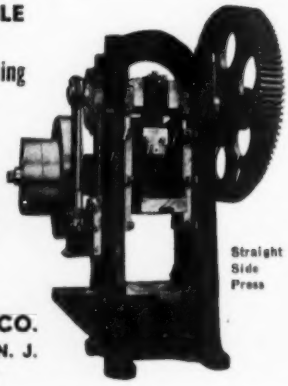
STRAIGHT SIDE SINGLE CRANK PRESSES
for heavy blanking and forming

Heavier classes of blanking and forming work can be handled efficiently and economically on these presses.

Sturdily constructed with either solid frame or built up with tie rods. Small elastic deflections do not affect tool alignment. All stresses taken centrally. Made also with wedge adjustment for slide for very close work.

Full details on request.



Straight Side Press

ZEH & HAHNEMANN CO.
NEWARK N. J.
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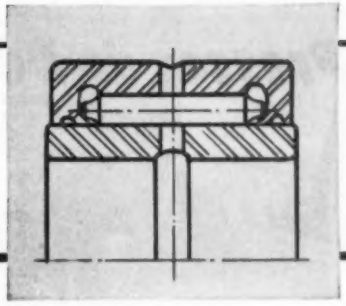
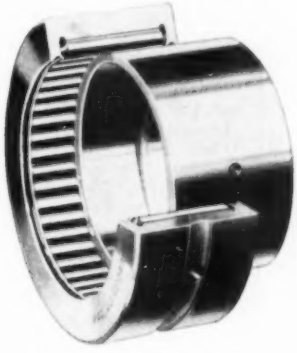
A bearing design of simplified construction reduces internal wear

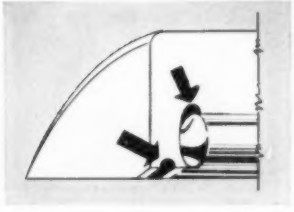


The performance efficiency and life expectancy of anti-friction bearings depends to a great extent on the ability of the bearing designers to hold internal wear to a minimum. They have found that wear can be materially lessened by reducing the number of bearing parts subjected to wear. In the case of MULTIROL SE Series roller bearings all parts have been eliminated except the anti-friction essentials of load carrying rollers and contacting races. Loose or welded in retaining rings and cages ordinarily found in roller bearings of this type have been discarded in the exclusive MULTIROL design.



Here rollers are retained by rolled over lips on end shoulders that are solid extended sections of the outer race. Cages are not required and other delicate parts that may wear, warp or break loose in mounting or in service are not needed. Numerous other advantages accrue from this MULTIROL bearing construction in addition to reduced internal wear and longer bearing life.

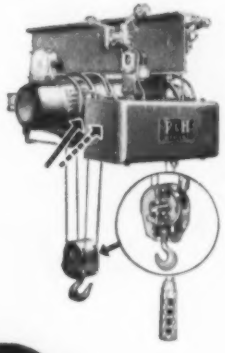
Lubrication Advantages

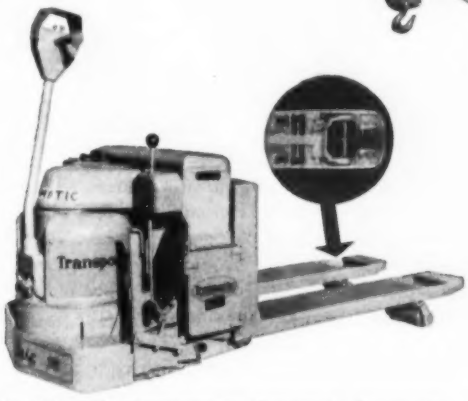


Important among these is the extra protection against destructive foreign particles provided in SE series bearings by a lubricant retaining groove, built into the inside diameter surface of the roller retaining end shoulder. The ring of lubricant held in this groove acts against the inner ring O. D., increasing the sealing effect of the precision tolerances between these shoulders and the inner race. Notice, too, the groove above the roller ends. Acting as a lubricant reservoir, this groove provides MULTIROL SE series bearings with an extra margin of protection against neglected or delayed lubrication.

Typical Performance

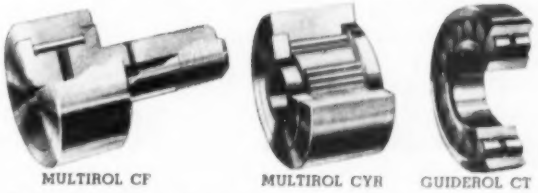
Harnishfeger P&H Hevi-Lift electric hoists carry up to 15,000 pound loads on MULTIROL SE series bearings. Their extra capacity and precision with ruggedness help reduce necessary radial bearing space in the upper and twin bottom sheaves. Two additional SE bearings add smooth efficient and dependable performance in the hoist transmissions.





The Automatic Transportation Company's Transporter uses eight Multirol SE Series bearings in the four rear wheels to carry 6000 pound capacity loads easily and freely. Wheels are mounted dual on each fork and two bearings with a center spacer support each wheel. These small but rugged bearings accommodate a large shaft with a comparatively small O. D. and materially reduce starting and rolling friction for finger-tip maneuverability of this heavy duty material handler.

Other McGILL® Bearings



MULTIROL CF MULTIROL CYR GUIDEROL CT

A new 140-page Bearing Reference Guide complete with 30 pages of vital engineering data has just been released by the McGill Manufacturing Company. It has the full story on the advantages of Multirol SE Bearings as well as information on the Multirol CF and CYR and Guiderol Bearings. Send now for your copy of McGill Catalog No. 52.

McGILL® — Precision Bearings

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Drill Presses do Double Duty

...when you equip them WITH Ettco-Emrick Tapping Attachments!

Get extra mileage out of your drill presses . . . convert them into fast, sensitive tapping machines at minimum cost with Ettco-Emrick Tapping Attachments. No alterations are necessary. Ettco-Emrick Tappers are designed to fit any make or model drill press and can be mounted in a few seconds. With them, any operator can turn out accurately tapped holes at high speeds. Here's why —

1. The brand new patented Ettco-Emrick friction clutch provides the delicate sensitivity needed in tapping or threading. It immediately detects dangerous overloading and protects both taps and work.
2. Supplied with or without quill clamps to fit any press.
3. Tap idles in the cutting direction, insuring faster tapping and prolonging the life of the tap cutting edge.
4. All parts are designed and built for high speed operation.
5. New lightweight, balanced tap chuck provides greater accuracy and rigid clamping of taps.

There's an Ettco-Emrick Tapper for every tapping requirement within the range of No. 0 to 1" taps. Ask your nearest Ettco-Emrick distributor for details. He's prepared to give you fast, efficient low-cost service in meeting your requirements.

WRITE FOR BULLETIN NO. 22

It contains full information on Ettco-Emrick Tapping and Threading Attachments.

ETTCO TOOL CO., INC.

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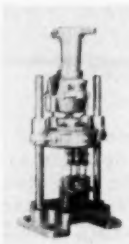
Dealers throughout the United States and Canada

DRILLING and TAPPING EQUIPMENT NEWS

Multiple Tapping and Drilling Heads Offer Big Savings

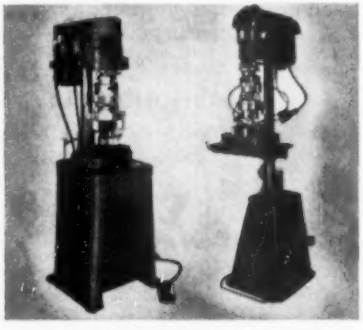


With Ettco-Emrick "Unit-Engineered" Multiple Heads, it is possible to tap or drill from 8 to 30 holes at one stroke on any drill press. Heads and work holders are engineered as a unit to meet shape and hole pattern of part being tapped and to insure fastest handling and tapping. Standardized stock parts keep initial costs low and allow heads to be converted from tapping to drilling or back again in a matter of minutes. *Details in Bulletin No. 3. Write Ettco Tool Co., 590 Johnson Ave., Bklyn. 37, N. Y.*

Balanced Tap Chuck Insures Greater Accuracy

Balanced construction of this newly designed precision-made Ettco-Emrick tap chuck eliminates "whipping" action and insures greater accuracy. Light weight and small external dimensions minimize spindle inertia on reversing, making it suitable for either light, sensitive work or heavy duty jobs. Sizes available with capacities ranging from No. 0 to 1" taps. *For details, write Ettco Tool Co., Inc., Johnson Ave., Brooklyn 37, N. Y.*

Tapping Machines Boost Multiple Head Output



Ettco-Emrick tapping machines are designed for automatic or semi-automatic operation with multiple spindle drilling or tapping heads and single spindle tapping attachments. The No. 72A machine is foot or air-operated. The No. 74 machine is air operated and electrically controlled. *Details in Bulletins No. 72A and No. 74. Write Ettco Tool Co., 590 Johnson Avenue, Brooklyn 37, N. Y.*

(Advertisement)

"she might have been my kid..."

"There was no time to stop, see? She comes running out from behind this parked car right under my wheels. Her hair is in pigtails, and with the sun shining on it, she might have been *my* kid. We got her to the hospital. It took 3 pints of blood to bring her around. All I have to do is remember the sound of those screaming tires—and I know why *I'm* giving blood."

Yes, all kinds of people give blood—truck drivers, office workers, salesmen. And—for all kinds of reasons. But whatever *your* reason, this you can be sure of: Whether your blood goes to a local hospital, a combat area or for Civil Defense needs—this priceless, painless gift will some day save an American life!

Business Executives!
✓Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Has your company given any recognition to donors?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed your employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Have you conducted a Donor Pledge Campaign in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?

Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

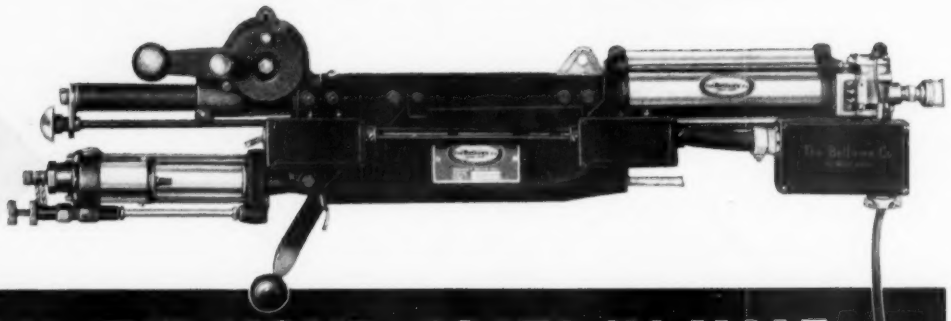
Give Blood Now

CALL YOUR RED CROSS TODAY!

NATIONAL BLOOD PROGRAM

IF YOU DRILL HOLES

this



CAN CUT YOUR COSTS IN HALF...

"This" is the Bellows Drill Press Feed. It goes on the star wheel shaft of any standard drill press. A touch on the operating lever and the Drill Press Feed advances the drill rapidly to the work, feeds the drill through the work at the correct feed rate, and returns the drill to its starting position. It's so simple in operation that workers with less than an hour's training can produce top quality work at top production rates.

It can be installed on a drill press in less than half an hour. It can be moved from one drill press to another. It doesn't interfere with hand operation of a drill press when desired.

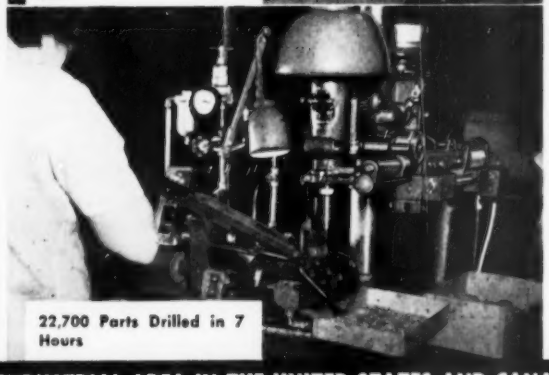
And, if the experiences of thousands of users are any criterion, it will pay for itself in your plant with the first two weeks' cost savings.

If you drill holes — it can cut your costs in half.

The Bellows Drill Press Feed is one of many "packaged" Controlled-Air-Power Devices to convert manually operated equipment to fast, low-cost automatic machines. New Bulletin CL-50 describes them all. Write for it today. No cost. No obligation. Address Dept. AM-553, The Bellows Co., Akron 9, Ohio.

400% Production Gain in this drilling operation

One minute per part by hand, 25 seconds per part now



22,700 Parts Drilled in 7 Hours

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NOW... *Correct Taper* FOR MAXIMUM GRIP

Correct Taper FOR EASY REMOVAL

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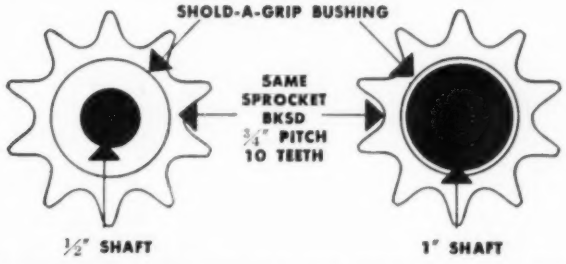
INTERCHANGEABLE TAPERED BUSHINGS AND SPROCKETS

BROADER SIZE RANGE. FIT SHAFTS ½" to 2½" by 16ths

Any commonly used sprocket, ½" to 2¼" pitch, can be interchanged on an extended range of shaft sizes. SHOLD-A-GRIP's high-strength design restricts screw holes to sprocket shoulder. Thus, many smaller sprocket sizes are added to the interchangeable class.

ONE SPROCKET FITS MANY SHAFT SIZES SIMPLY BY CHANGING THE BUSHING



Example: Sprocket BKSD, ¾" pitch, 10 teeth, can be used on **9** different shaft sizes, any size from ½" to 1" by 16THS, by inserting the correct size SHOLD-A-GRIP Bushing.

Illustration at top of page is typical design of SHOLD-A-GRIP Bushing and Sprocket with minimum number of teeth.

Illustration at right is typical of design of SHOLD-A-GRIP Bushing and Sprocket with maximum number of teeth.

Correct Taper FOR SLIP-PROOF GRIP

Boston Gear expert engineering has provided a correct taper in SHOLD-A-GRIP Bushings and Sprockets for slip-proof grip. When screws are tightened the bushing grips both sprocket and shaft with maximum holding power, even on shafts which vary from true diameter.

Correct Taper FOR EASY DISASSEMBLY

Correct taper saves time and trouble in removal. Cap screws are removed, then two screws are driven in the two threaded holes in bushing flange. Tightening screws releases bushing—quickly, easily.

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BOSTON Gear

DISTRIBUTOR

for complete information and descriptive folder, or write: Boston Gear Works, 60 Hayward St., Quincy 71, Mass.

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KNIGHT'S

Power Feed

ROTARY TABLES

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- **No Set-Up Time — No Special Equipment**
- **Just Plug Into Nearest Electric Outlet**

Especially designed for fast, precision Cycle Milling and Indexing—Continuous Face Milling—Cam Milling—Other special purpose jobs that require an Automatic Revolving Fixture. An exceptional time and labor saver!

20" MODEL: 18 quick-feed changes, 1½" to 52", or 3" to 108"

42" MODEL: Infinite variable feed. Table can be increased to 72" with sub-plates.

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☐ Also send details on Knight Milling Machines

From the *American Machinist* Library of Tips for Top Shop Men

EVERY time you try something new, somebody will call it "a dangerous precedent." Remember that everything new is either wrong or a dangerous precedent to the timid. If you let such reasoning sway you, you'll never do anything new. Only ideas that aren't "dangerous precedents" are the duds.

IF you're planning to introduce a labor-saving method that will displace men, and you know there'll be a kickback, get it set to go anyway. Then wait for "evaporation" — normal quits and dismissals — to cut your working force to the newer, lower level. There'll be no trouble—if your men trust you and the company.

What do *you* want to know more about?

Plastics? Forging? Milling? Employee training? Materials handling? Presswork? Depreciation? Testing and Inspection?

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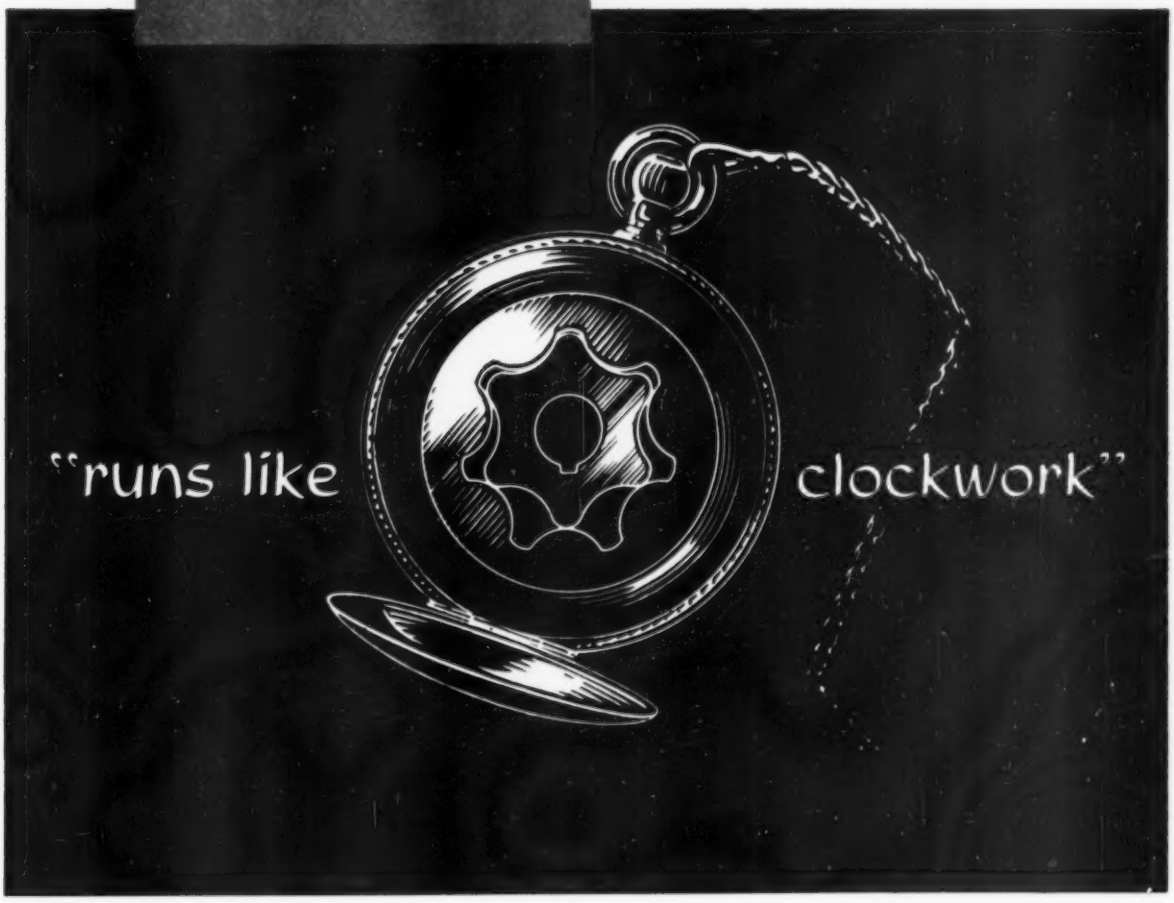
New York 36

the GEROTOR mechanism



because it's **PRECISION** engineered

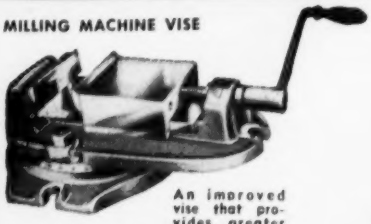
In every GEROTOR pump or motor, precisely paired gear-shaped elements transmit power from or to the shaft with high efficiency. These elements, revolving in the same direction at low relative speed, constitute the GEROTOR mechanism . . . famed for longer life, less wear, less slippage, dependably smoother performance. With GEROTOR pumps or motors, hydraulic circuits "run like clockwork", too.

Gerotor May Corporation, Baltimore 3, Md.

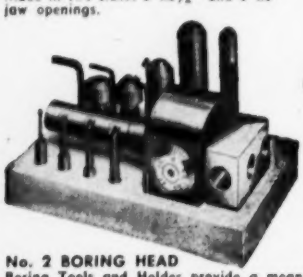
GEROTOR

HYDRAULIC PUMPS & FLUID MOTORS

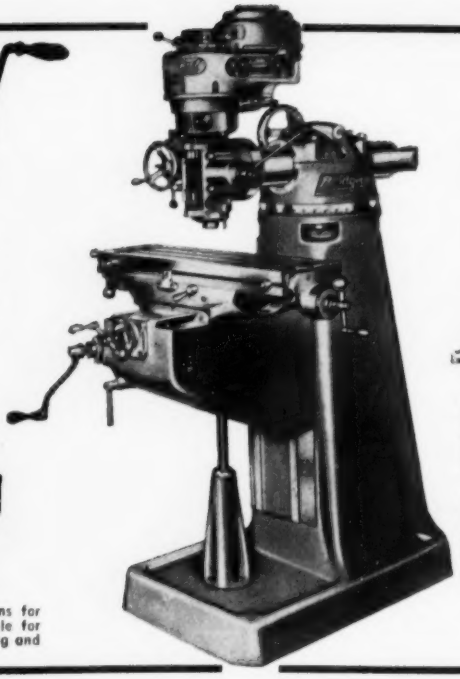
MILLING MACHINE VISE



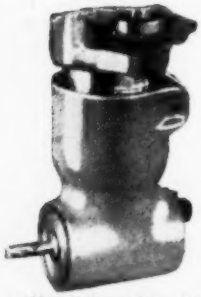
An improved vise that provides greater gripping power, is streamlined for appearance and incorporates a coolant trough. A large diameter screw assures rigid holding. Made in two sizes: 5"x3½" and 6"x5" jaw openings.



No. 2 BORING HEAD
Boring Tools and Holder provide a means for boring holes up to 6" diameter. Available for use on BRIDGEPORT 1 HP Milling, Drilling and Boring Attachments.



RIGHT ANGLE ATTACHMENTS



(Above) Heavy Duty Attachment for milling and drilling at right angles. Fits both Master 1 HP Bridgeport Heads.

(Right) Light Duty Attachment . . . designed for right angle milling and drilling narrow, deep molds and cavities.

Note the acceptance record of

Bridgeport

TURRET MILLING MACHINES in less than two years . . and WHY

MACHINES SHIPPED . . . AS OF JULY 1951 . . 13739

MACHINES SHIPPED TO DATE 17601

Several factors can be cited as reasons for the phenomenal acceptance and popularity of "BRIDGEPORTS":

. . . they meet universal demands from *all* classes of metal working . . . die shops, tool rooms and production lines.

. . . their versatility, convenience, speed and economy make them of outstanding utility on a wide range of work. They can be kept busy productionwise assuring maximum hours of profitable service.

. . . attachments available (some of which are shown here) extend their utility still further.

. . . low first cost places "BRIDGEPORTS" within the reach of *all* shops, large and small.

. . . BRIDGEPORT and BRIDGEPORT *only* provides this exclusive feature: a means of milling, drilling, boring and shaping combined with ability to position the milling head at all angles over a wide area . . . *without changing set up.*

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Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

Short or Long Term CAPITAL LOSS?

No matter how they are figured— eye accidents are costly to industry. Here are some of the estimated charges:

1. They cost nearly $400 in average compensation.
2. They cost $176,000,000 in lost man hours annually at an average per hour rate of $1.60.
3. They cost an unknown but sizeable sum in idle machine time. (Remember, industry invests $6,000 or more in tools to provide each job.)
4. They cost another appreciable sum in impaired worker morale.
5. They cost additional money in increased rejects and lowered output when green workers must be substituted for skilled.
6. They cost money in first aid and medical attention whether the eye injury is major or minor.

Any industrial eye accident is a capital loss. If you lose the skill of a valued worker through the loss of an eye, you have a long-term capital loss in a very real sense—with no gain, long or short, to compensate. Contact your nearest AO Branch Office and learn how an AO Eye Protection Program can practically eliminate these costs and pay for itself in less than six months. Or write American Optical Company, 5135 Vision Park, for free booklet "Improved Industrial Vision" which tells how AO's Industrial Vision Program cuts costs, increases production, decreases accidents.

American Optical COMPANY
SAFETY PRODUCTS DIVISION

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"... More than 6,000 of our employees are now participating ..."

MELVIN H. BAKER
Chairman of the Board, National Gypsum Company

"The Payroll Savings Plan for Bonds provides a convenient and profitable way for America's wage earners to save. Millions of Payroll Savers have become proud owners of homes purchased with Bonds bought this way. It also helps our national government with its problems of managing the public debt. We in National Gypsum urge the stimulation of the Payroll Savings Plan and are proud to report that more than 6,000 of our employees are now participating."

Here's another success story of a person-to-person canvass:

In the Wahoo (Nebraska) ordnance plant of the National Gypsum Company, employee participation in the Payroll Savings Plan was a very low 1.73%.

In September of last year, with the whole-hearted encouragement of top management, the 3,000 employees of Gypsum's Ordnance Plant organized to conduct a person-to-person canvass to put a Payroll Savings Application Blank in the hands of every employee.

90% of the employees signed up in the opening days of the campaign. By September 12th, employee participation was 93.7%. On October 2nd, participation was almost 97%—and still going up.

To quote from National Gypsum's printed report of the Payroll Savings campaign:

• "Did we use fancy charts! Did we use advertisements? Did we have long-winded meetings. Did we give prizes for production? The answer is No! We put the proposition squarely to the people, and we reported to the people once a week in bulletin form to let them know where they stood in relation to other departments as well as to the plant total. Once the spirit of competition and teamwork caught fire, once it became a matter of personal pride; a successful conclusion was only a matter of time and effort."

Justifiably proud of its sponsorship of the Payroll Savings Plan and the 97% enrollment of its employees, National Gypsum Company prepared a very interesting folder, "Bombs and Bonds for National Defense. The Savings Bond Program of the National Gypsum Company." Savings Bond Division, U. S. Treasury Department, Suite 700, Washington Building, Washington, D.C., will be glad to send you a copy. Read how easy it is to build *your* Payroll Plan to 90% or more participation.

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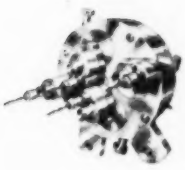
FULLY ADJUSTABLE DRILLING HEAD



Here's a light, compact tool with a wide range of adjustment. Can drill on squares, rectangles, circles, triangles and irregular patterns.

FOR MULTIPLE DRILLING OF HOLES ON PRODUCTION RUNS . . .

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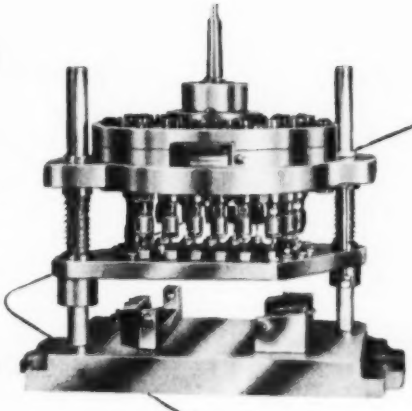
FIXED CENTER DRILLING HEADS with JIGS and FIXTURES



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ADJUSTABLE TAPPING HEAD

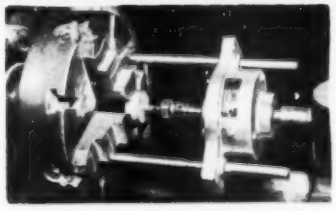
Fully geared. Needle bearings on all spindles in head. Ball thrust bearings throughout. Bronze bushed. Sand cast aluminum case.

ADJUSTABLE DRILLING HEAD

This versatile tool permits you to take advantage of a wide range of adjustment without overhang.

UNIVERSAL JOINT DRILLING HEAD

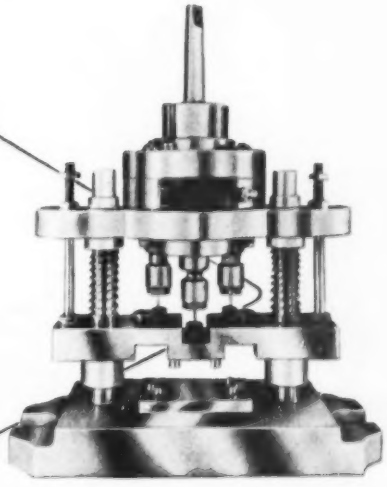
This dependable tool is adjustable to any pattern of holes. Available with 4 to 12 spindles. All aluminum housing construction, thrust bearings and gears turned on spindles.



AUTO-REVERSE TURRET LATHE TAPPING HEAD

A new tool, practical, time-saving, money-saving. In a turret lathe setup it allows you to tap the hole and back out the tap without stopping the work or reversing the machine.

Do more . . . and do it better with Errington Fixed Center Drilling Heads. They drill any number of varied size holes on different elevations. The head has grooved thrust ball bearings at all thrust points and hardened bronze radial bearings. Heat treated spindles and gears, of one piece turned from solid bar stock. It is geared approximately 2:1. All enclosed in a sand-cast aluminum case and cover, with alemite pressure lubrication.



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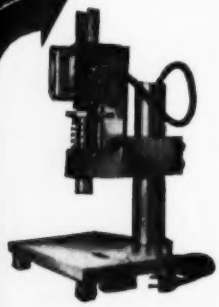

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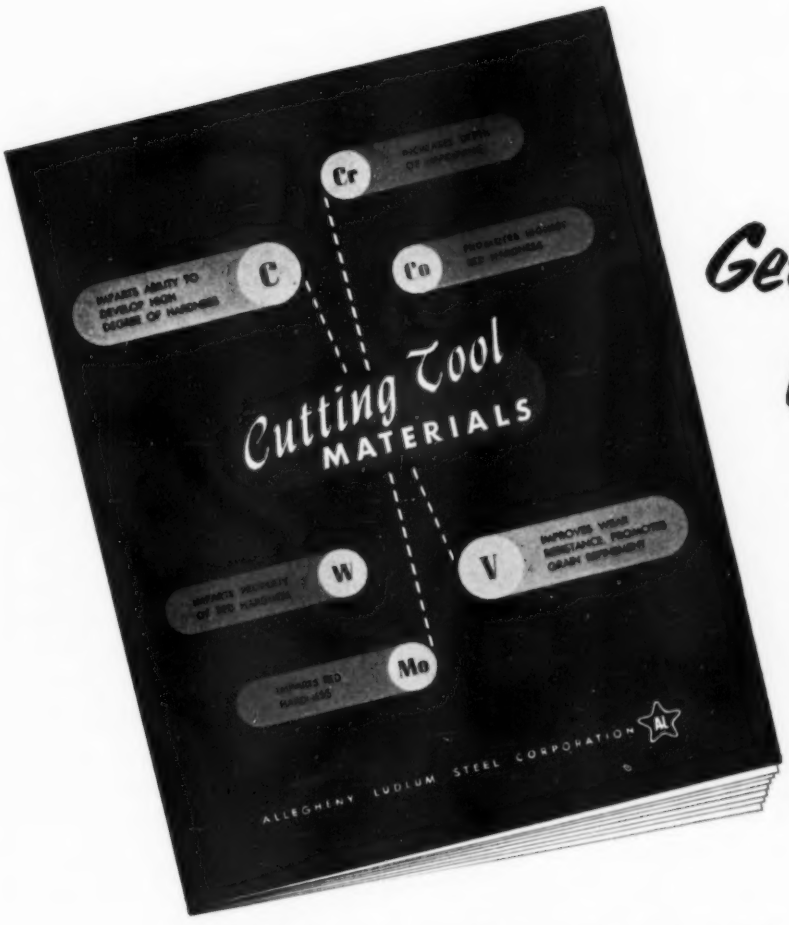

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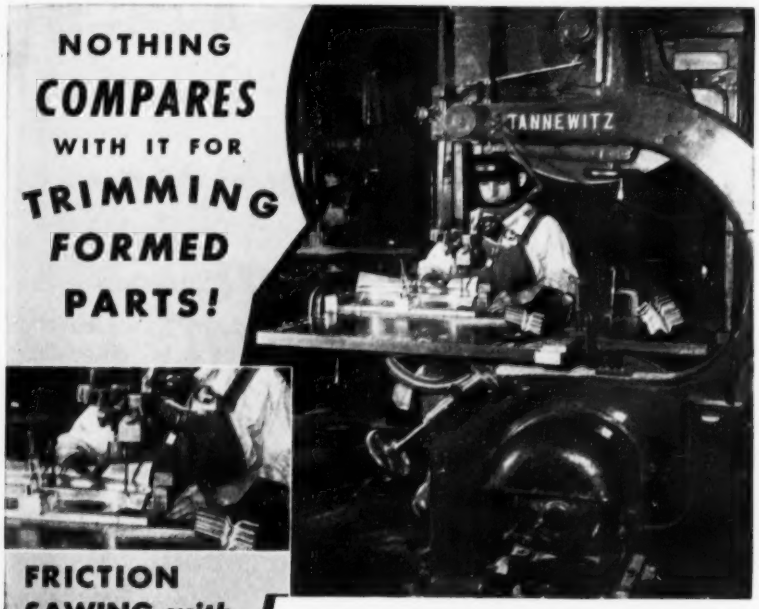
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Tremendous savings of time and money are effected in trimming formed parts with Tannewitz High Speed Band Saws, for not only are the cuts made fast and smoothly, but in most cases no jigs or rests of any kind are required. Sheets of both soft and hard steel, non-ferrous metals and many other materials are also handled to great advantage by this method and it is perfect for trimming castings. By all means get the complete facts and learn of the many opportunities for boosting production and lowering costs that Friction Sawing with Tannewitz High Speed Band Saws offers.
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Over 42 per cent of metalworking production equipment was over 10 years of age in 1949 . . . 19 per cent was bought more than 20 years ago. These machines have had an average of a quarter century of use, including five years of wartime overwork and mistreatment.

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The one quick way to build a machine around any part . . .

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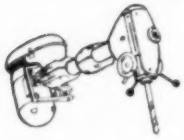

DRILL HEADS Standardized, adjustable heads can be indexed and locked at any angle or position *without special tools.* Variable throat. Right or left hand manual feed. $265*

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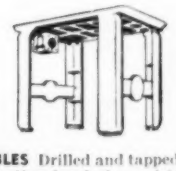
POWER FEED (Mechanical Type) Attaches to MAGNA DRILL head in a few minutes. Feed rates .003" to .012" per rev. Solenoid engage. Spring return. Automatic cycling. $175*



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This cast steel frame type unbreakable press combines rigidity with minimum deflection. It is the result of 34 years specialized experience in the field of metal stamping. Manufactured in four standard capacities as listed in Condensed Specifications herewith.

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- All moving parts fully protected.
- Motor driven individually, completely enclosed "V" belts transmission.
- Screen safety device closes completely before clutch engages; work accessible only after a full stop of press.
- Safety screens replaceable quickly without special tools.
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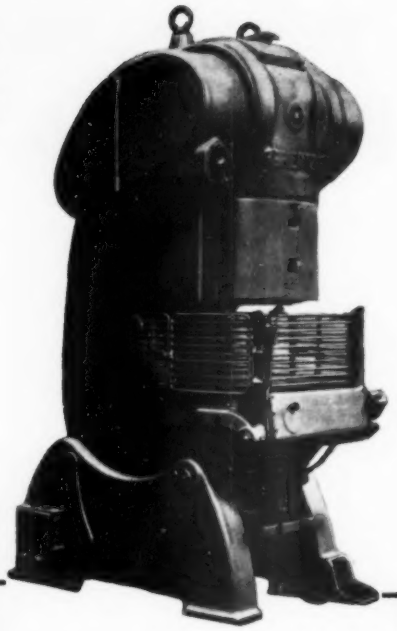
- Stroke quickly adjustable to suit job.

A lockable selector switch allows:

1) inching for tool setting
2) one stroke cycle with stop on top position
3) continuous running, "Stop" pushbutton controlled
4) stop. No way to start the press

Send for illustrated literature and complete specifications



Type	Pih 5x240	Pih 8x280	Pih 10x300	Pih 12x335
Max. Capacity Tons	50	80	100	130

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with motor-driven table for fast and easy positioning of work

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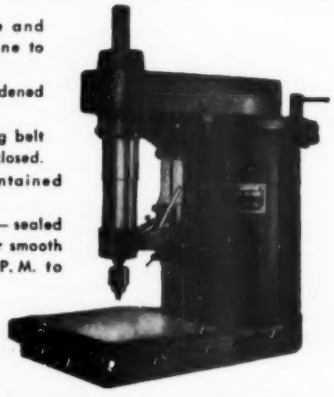

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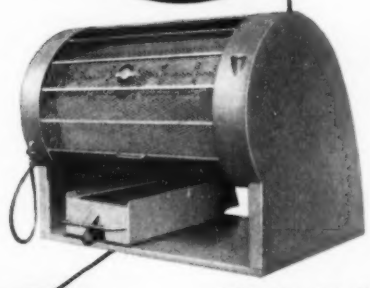
Larger capacity machines take 31% to 80% more work-load in same floor space. Improved cutting materials shorten cutting cycle by 15% to 25%. Grav-i-Flo installations substantially reduce capital investment, floor space, and production time!



Model 66″, two compartments

MACHINES

Model 48″, two compartments

Grav-i-Flo 66″, 48″ and 36″ machines have cam locked doors with manually released safety stops; available with unlined or rubber lined cylinders, constant or variable speed drive, J.I.C. controls, and timers from 5 minute to 20 hour cycles. Equipped with electric wiring and water piping installed ready for plant hook up.

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Designed For Small Lot Production and Laboratory Processing.

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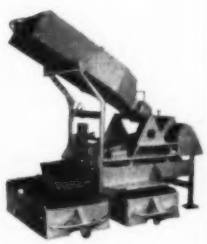
Two deck parts-and-chips separator and chip grader



Occupies less floor space. Separates parts quickly without impingements. Grades 3 sizes of chips simultaneously.

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Grav-i-Flo natural and synthetic deburring and finishing chips and highly developed compounds consistently outperform every type of tumbling process offered on the market.

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Grav-i-Flo superiority in equipment and supplies has been proved to hundreds of users in many different industries. Let us show you, too, at no obligation. Our representative will visit your plant, or send samples direct to us. Engineering Service available to all users.

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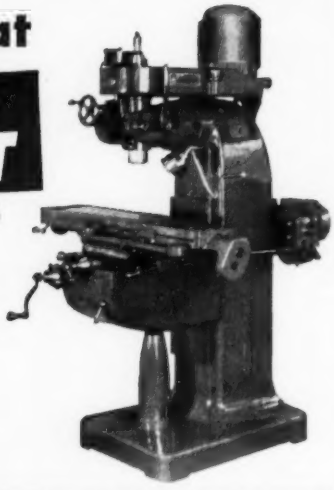
INDEX MILLING MACHINES

Pay Off in ACCURACY and TOP PERFORMANCE at

an Amazingly LOW COST

Model 55



Milling, Drilling and Boring need not be expensive . . . Thousands of metal-working plants have learned it . . . Index Mills are the answer . . . Their demand is big and constantly growing. Pictured is the improved VERTICAL MODEL 55, a large capacity, versatile machine . . . Has a speed range of 80 to 2700 RPMs, 1 H.P. drive, 3⅛" quill, extra rugged spindle, capacity of ⅛" to 1½" end mills in tool steel. Spindle quill travel, 5¼". Table 40" x 9" or larger.

VERTICAL MODEL 40

An outstanding machine that has proved itself in highly satisfactory service for 15 years. While it is not a jig borer, it is widely used for accurate boring and locating. The improved spindle drive gives nine spindle speeds, an ample range for all operations. CAPACITY, ⅛" to 1" end mills in tool steel. TABLE, working surface 8" x 26", 8" x 34" overall.

HORIZONTAL MODEL 60

A simple, efficient machine that in many ways equals or exceeds a light No. 2 in capacity. Designed for the average tool room, but its rigidity and low maintenance cost make it suitable for production shops. Standard table 40" x 9" with larger table optional. Compact and with all operating parts enclosed yet readily accessible. Controls conveniently located for ease of operation.

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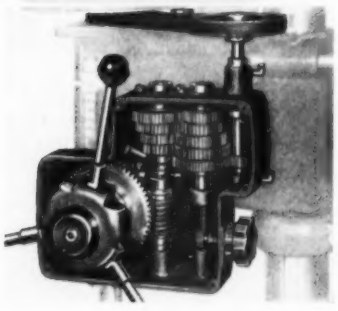

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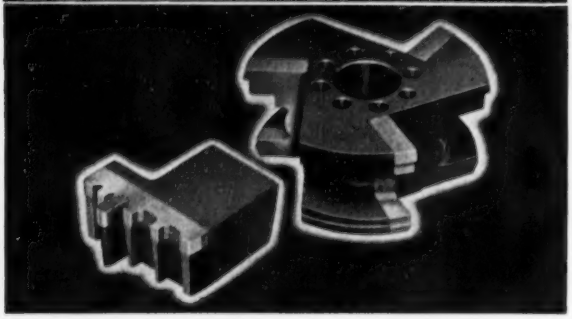

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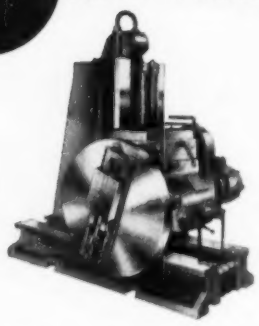

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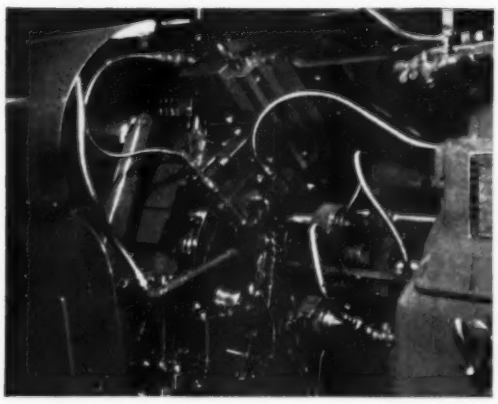

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5	30-32-36-40-48
6	30-40-48-56-60
7	32-40
8	24-30-36-38-40-44-48
9	24-28-32-40
10	28-30-36-40-48-64
12	20-28-32-36
14	20-24-28
1/16	56-64
5/64	72
3/32	48
7/64	48-56
1/8	32-40
5/32	32-36-40
9/64	36-40
11/64	36
3/16	20-24-32
13/64	32
7/32	24-28-32
1/4	18-24-26-27-30-32-36-40
5/16	16-20-22-27-28-32-40

SIZE	THREAD
3/8	12-16-18-20-27-28-32-36-40-48
7/16	12-16-18-22-24-27-28-30-32-36-40
1/2	12-14-16-18-22-24-26-27-28-30-32-40
9/16	16-20-24-27-28-30-32-40-48
5/8	12-14-16-20-24-27-28-32-36-40
11/16	11-16-18-20-24-27-28-30-32
3/4	9-11-12-14-16-20-24-26-27-28-32
13/16	10-14-18-20-32
7/8	10-12-16-18-20-24-27-28-32
15/16	8-9-10-12-14-16-18-20-24-32
1	10-12-16-18-20-24-27-32-40
1-1/16	12-14-16-18-20-24
1-1/8	8-10-14-16-18-20-24-32
1-3/16	8-10-12-14-16-18-20-24
1-1/4	8-10-14-16-18-20-24-32
1-5/16	12-14-16-18-20-24-32
1 3/8	8-10-14-16-18-20-24
1-7/16	8-10-12-16-18-20-24
1-1/2	8-10-14-16-18-20-24-28
1-9/16	18-20-24
1-5/8	5-1/2 - 8-10-12-13-16-18-20-24
1-11/16	10-12-14-16-18-20-24

SIZE	THREAD
1-3/4	8-10-12-14-16-18-20-24
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20-24
1-15/16	8-10-12-14-16-18-20-24-28
2	4-1/2-8-10-12-16-18-20
2-1/16	12-14
2-1/8	12-16-20
2-3/16	12-16
2-1/4	4-1/2 - 8-12-14-16-18
2-5/16	12-18
2-3/8	12-16-18
2-1/2	8-10-12
2-9/16	18
2-5/8	12-16-20
2-3/4	16
2-7/8	8-12-16
3	8-16
3-1/4	8-12-16
3-1/2	8-12-16
3-7/8	8
4	8-12

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2	56-64
3	56
4	32-36-40-48
5	40-44
6	32-36-48
8	32-36-40
10	24-30-32-40
12	24-28-32
1/4	20-28-32
5/16	18-20-24-28-32

SIZE	THREAD
3/8	16-24-32
7/16	14-20-28
1/2	12-13-20-28
9/16	12-18-20-24
5/8	11-12-18-20-24
11/16	11-16 24
3/4	10-16-18-20
13/16	16
7/8	9-12-14-18-20
1	8-12-14-16-18-20
1-1/8	7-12
1-1/4	7-12-16-18

SIZE	THREAD
1-3/8	6-8-10-12-16-18-20-24
1-7/16	8-10-12-14-16-18-20
1-1/2	6-8-10-12-16-18-20
1-9/16	8-10-12-16-18-20
1-5/8	8-10-12-14-16-18-20
1 11/16	8-10-12-14-16-18-20
1-3/4	8-10-12-14-16-18-20
1-13/16	8-10-12-14-16-18-20
1-7/8	8-10-12-14-16-18-20
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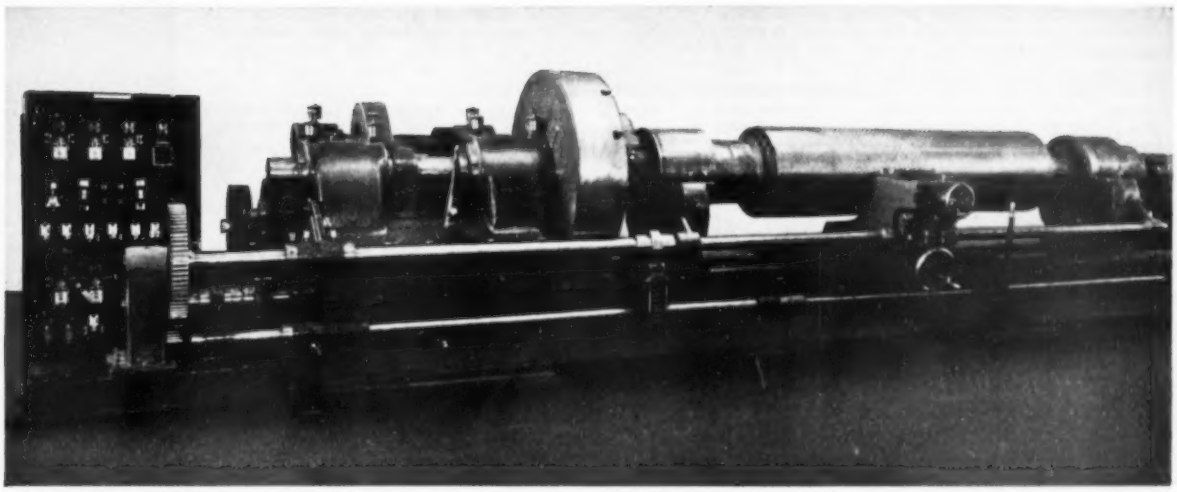

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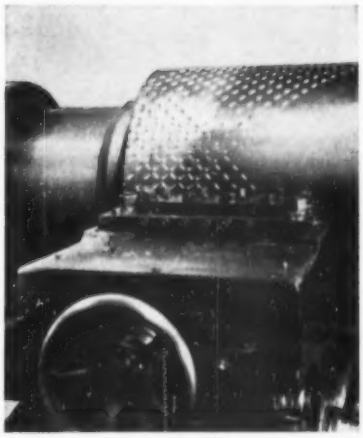

***Close-up of tool carriage** shows how rolls are grooved. The rolls are used in manufacture of steel safety floor plates.*

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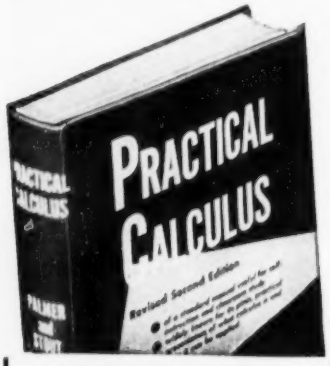

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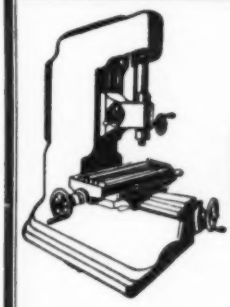

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U.S. small shop wanted near Niagara district, by Canadian Company, to manufacture a specialty with good profit but limited sales. Forty years record. 20" lathe and 16 gauge sheet metal machinery needed. D. M. Grant, 993 Eastern Ave., Toronto 8, Ont.

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AUTOMATIC #0 B & S Wire Feed Screw, Late.
AUTOMATIC, Cleveland Model #B-1½" Sgl. Spdl.
AUTOMATIC #2 B & S Wire Feed, 1" screw, Late.

BALANCER, Anderson Bros. 14"x64", Roto-Checker.
BORING MILL, 24" Bullard M.D., V.T.L.
BORING MILL, 36" Bullard M.D., V.T.L.
BORING MILL, 36"x44" Niles Vert. M.D., Side Head.
BORING MILL, 2¼" Lucas Horiz., M.D.
BORING MILL, Lucas Horiz. 3" Bar, M.D.
BORING MILL, Giddings & L. #0 Horiz. 3½" Bar.
BARRELS, Tumbling Lupomatic, Schutte & Koetring.
BRAKE, #335 Chicago, M.D., Press, 6' 15 ga., NEW.
BRAKE, #185 Chicago Power Apron, 8'x3 16" cap.
BROACH, #3 LaPointe Horiz. 50" Str. M.D.

COMPRESSOR, Ingersoll Rand ER-1, 10 HP, M.D.
COMP., 15 HP, 10 HP, Gardner Denver, M.D., New.
COMPRESSOR, C-P 50 HP, M.D., 10x10, 278 CFM.
COMPRESSOR, Ing.-Rand ER-1, 100 HP Syn. M.D.
CRANE, OET Ricker 2 tons 11'9" span.
CRANE, Canton #8 Portable Gooseneck 3 ton cap.
CHIP WRINGER, 20" Tolhurst M.D., Late.
GAS CUTTER, Airco #4 & #10 DB Radiagraph.

RADIAL DRILL, 3' 9" Mueller, M.D.
RADIAL DRILL, 4'x11" American, M.D.
RADIAL DRILL, 5'13" Cincinnati-Bickford, M.D.
RADIAL DRILL, 6'x15" Cincinnati-Bickford, M.D.
RADIAL DRILL, 30" Walker Turner M.D., Late.
DRILL, Fosdick 16", S.S. Power Feed, M.D.
DRILL, #2 Colburn M.D., #4 M.T., M.D.
DRILL, #121 Baker Auto. S.S. Cam Operated.
DRILL, Deep Hole, Avey-Draulic #2, M.D.
DRILL, Edlund #2B, 3 spdle. #2 M.T., 16".
DRILL, 4 & 6 Sp. Avey 12" overhang, #3 M.T., M.D.
DRILL, 4 Sp. Barnes H.D., M.D. #4 M.T., P.F.
DRILL, Cincinnati 21" with Tapping Attach. M.D.
DRILL, Natco Multiple Spdle. #12, #1 M.T., M.D.
DRILL PRESSES, Leland Gifford #1M8, 1, 2, 3, 4.
DRILL PRESS, #2M8 Buffalo Forge single spindle.
DRILL, Barnes, 24" S.S. #4 M.T., 1¾" cap.
DRILL PRESS, #25 Foote-Burt S.S. 24", #5 M.T.
DRILLS, #14, #15, #16, #18 Buffalo Forge, M.D.
DEEPFREEZE Motor Products 40 below zero.
DEMAGNETIZER, SB-911 Magnaflux, late type.

FACING HEADS, 20" & 24" Mummert-Dixon.
FILER, #11-S Cochrane Bly Auto Saw Filer.
FILER, Type P4, Oliver Floor Type, M.D.
FURNACE, Westinghouse Elec. 18 KW. 2100° F. cap.

GRINDER, M.D. Sanford Surf. 8"x12" cap., New.
GRINDER, #1 Wilmarth Norman Hand Surf., 6"x12".
GRINDER, #2 Imperial Univ. Tool & Cutter, New.
GRINDER, #2 Brown & Sharpe Sur. 6"x18" cap., M.D.
GRINDER, 6"x18" Thompson "F" Hyd. Late.
GRINDER, #4 G & L Univ. Tool & Cutter, M.D.
GRINDER, Disc. Besly #205, 18" Dble End.
GRINDER, Heald Rotary #25, M.D. 16" Cap.
GRINDER, Cylindrical, Norton 10"x24", M.D.
GRINDER, Brown & Sharpe #4 Univ. 12"x60".
GRINDER, #13 B. & S. Univ. Tool & Cutter.
GRINDER, Thread, Jones & Lamson #TG-615, Late.
GRINDER, Thread Jones & Lamson #TG848, Late.
GRINDER, Heald #72A-3 Internal Size-Matic.
GRINDER, 14"x36" Pratt & Whitney Vert. Surf.
GRINDER, Pratt & Whitney 22"x84" Vert. Surface.
GRINDER, Greenfield #12 Int. Hydromatic, M.D.
GRINDER, Oliver Auto. M.D. Drillpointer, #510.
GRINDER, #33 Abrasive Vert. Auto. Surface, M.D.
GRINDER, #22 Heald Horiz. Rotary Surface, M.D.
GRINDER, Diamond Snagging 10 HP, 24"x4½".
GRINDER, Norton 6x18 Vert. Surface, Hyd. Late.
GRINDER, #60 & #70 Heald Internal.
GRINDER, Landis 6"x18" Hyd. Cyl. late type, M.D.
GRINDER, Sellers Type #1A Tool, 24" wheel.
GRINDER, 37" Wheel Dia. Osterholm Dise, 24" cap.
GRINDER, 30" Ingersoll Tub Face Mill, M.D.
GRINDER #79-72 Gardner Vert. Spindle, Late.

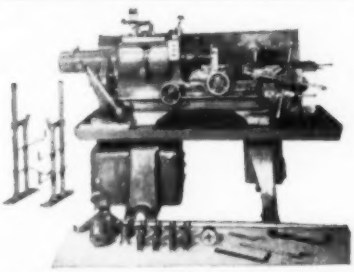
#13 BROWN & SHARPE Universal Tool Grinder, Motor Driven.

GRINDER, #214—30" Besly Double End Disc, Late.
PROFILE GRINDER, Studer Type P8M, M.D., late.
GEAR SHAPER, Fellows #6 High Speed, M.D.
GEAR SHAPER, Fellows #7 High Speed, M.D.

HAMMER, Rochester Hispeed, all sizes, M.D.
HAMMER, Bradley 200# Rubber Cushioned Helve.
HEADER, Manville #1 S.S.D.D. Cold 3-16".
INDUCTION HEATER, 16 KVA Ecco Hi Frequency.
INDUCTION HEATER, 30 KW Lepel, Late Type.
AIR MOTOR HOIST, Ingersoll Rand 2000# cap.
ELECTRIC HOISTS, 500-4000 lbs. Whiting, NEW.
HONE, #194 Barnes Vertical, M.D., Hyd. Late.

KEYSEATER, #5 Mitts & Merrill, Giant, M.D.
LAPPER, 2F Norton Vert., M.D., late type.

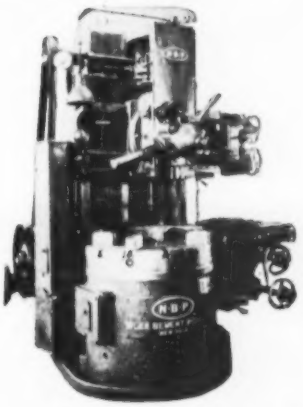
No. 7 BARDONS & OLIVER Geared Head
Full Universal Turret Lathe, Preselector Head, Bar Feed, 4" capacity through spindle, Late Type, Motor Driven.



#2 WARNER & SWASEY Geared Head Turret Lathe, 12 Spindle Speeds, Bar Feed.

LATHE, Le-Swing 8"x108", M.D., A.C. Rebuilt.
LATHE, Porter-Cable 9"x15" Geared Head Prod.
LATHE, 12" Reid Smallpiece Production, Late Type.
LATHE, Hendey 12"x5' Q.C.G. Taper Attach. M.D.
LATHE, LeBlond 14"x6', Q.C.G., M.D.
LATHE, Hendey 14"x8' Q.C.G. Taper Attach. M.D.
LATHE, American 16"x6' Q.C.G., Grd. Hd. M.D.
LATHE, Lehman 18"x7' Q.C.G., M.D.
LATHE, American 18"x10' Q.C.G., Grd. Hd.
LATHE, South Bend 18-28"x8' Gap Bed, Q.C.G. M.D.
LATHE, Reed-Prentice 20"x10' Grd. Hd. M.D.
LATHE, LeBlond 22"x10' Q.C.G., M.D.
LATHE, 24"x12' Boye & Emmes Grd. Hd., T.A., Late.
LATHE, Putnam 23-32"x12' Q.C.G., M.D.
LATHE, LeBlond 24"x14' Q.C.G., Grd. Hd.
LATHE, Lodge & Shipley 26"x14', Q.C.G., M.D.
LATHE, Bridgeford 27"x12' Geared Head, M.D.
LATHE, 27"x16' Niles Timesaver, Grd. Hd., M.D.
LATHE, Bridgeford 32"x16' Q.C.G., Grd. Hd.
LATHE, 42"x18' Pittsburgh Geared Head, M.D.
LATHE, Buffing Dble. End #VMT5, Devine Bros.
LATHE, Turret #1 Bardons & Oliver Electric Head.
LATHE, Turret, #2 Simmons Vari Drive 220 V.
LATHE, Turret #2 W. & S. Univ. Grd. Hd., Late.
LATHE, Turret, #4 Warner & Swasey Univ. 1½".
LATHE, Turret #4DE Potter & Johnston Auto., 1942.
LATHE, Turret #6 Warner & Swasey Grd. Hd. Ram Type, Bar Feed, Motor in base.
LATHE, Turret #7 Bardons & Oliver, 4" cap., Late.
LATHE, Turret #2 Cinci. Arms Univ. Geared Head.
LATHE, Turret, #3A Warner & Swasey Univ. M.D.
LIFT TRUCKS, Baker 1 & 2 ton, Platform & Fork.

MILL, #4 Burke Motor Driven, Late, M.D.
MILL, #2 Pratt & Whitney Prod. Duplex, M.D.
MILL, #3VB Hardinge Vert. Bench, M.D.
MILL, #4B Brown & Sharpe H.D., Horiz. M.D.
MILL, #14 Garvin Plain Horiz., M.D.
MILL, #0Y Brown & Sharpe Plain Horiz., M.D.
MILLING MACHINE, #2P K & T Horiz., M.D.
MILL, Cinci. Horiz. #3, #4, #5 High Power, M.D.
MILL, #1 Brown & Sharpe Plain Horiz., M.D.
MILL, #0-B Cinci. Vert. Prod. Late, M.D.
MILL-MILLER, U.S. Tool #MM-4 Auto. Prod.
MILL, #0 Douglas Plain Horiz. M.D., Coolant.
MILL, #0 Sundstrand Rigidmil Hyd. Late Type.
MILL, #0 Vernon Hand Mill, M.D., Late.
MILL, 2A Brown & Sharpe Horiz. Univ., M.D.
MILL, #2SP Van Norman Horiz. M.D., Late.
MILLING MACHINE, Kempsmith #2 Horiz. Univ.
MILL, #3 Cinc. Univ. Horiz., M.D.
MILLING MACHINE, LeBlond #4 Horiz. Univ.
MILL, #2 Vert. M.D. Brown & Sharpe.
MILL, #3 Cinci. Vertical Hi Power, M.D.
MILL, #5C Becker Vert. Die Sinker, M.D.
MILLING MACHINE, #2 Van Norman Duplex, M.D.
MOTOR GENERATOR SET, Gen. Electric 100 K.W.
NIBBLER, #196 Savage 36"x3 16" Cap., M.D.
NAILING MACHINE, No. 16—48"-51" Morgan, Late.



36" x 44" Niles Vertical Boring Mill, Side Head, Motor Driven.

THREADING, Staybolt Lassiter Millholland 1½".
THREAD MILL, 7½x11 Hanson-Whitney, Univ.
THREAD MILL, 6x14 Pratt & Whitney No. 1105.
THREAD MILLER, Lees-Bradner #40A Automatic.
THREAD MILLER, Pian-O-Mill #3 Planetary Form & Thread Semi-Automatic Milling Machine, Late.

PAPER SHREDDER, No. 10 Mitts & Merrill, M.D., Late.
PLANER, Cincinnati 30"x30"x12' A.C., M.D.
POWER PRESS, Bliss #164 Open Back, M.D.
POWER PRESS, Bliss #3A S.S. Dble. Crank Grd. 45 tons, 4" stroke, 36"x26" Bed Area, M.D.
POWER PRESS—Bliss-Consolidated #163-B Straight Side Dble. Crank 45 tons, M.D.
PRESS, #5 Johnson OBI, 56 tons, new.
PRESS, #7 & #8 Johnson OBI 79 & 90 tons, New.
PRESS, 135 Ton Clearing Single Crank 8" Str., Late.
PRESS, 70H Drake Hyd. Arbor, New.
PRESS, 78½ Bliss S.S. 9½ Str. M.D.
PRESS, Federal #2 O.B.I. Grd. 2" Stro.
PRESS, Bliss #18, #19, #20, #21, OBI, A.C., M.D.
PRESS, Waterbury-Farrel High Speed 60 tons #3W.
PRESS, 68 C Bliss Double Action, 3 crank.
PRESS, Lucas 15 tons Power Arbor, M.D.
PRESS, #68 Whitney Deep Thr. 24", foot.
PRESS, P2, P3 Ferracute M.D. Roll feed.
WHEEL PRESS, 600 ton Niles Bement Pond, A.C., M.D.
PANTOGRAPH, #1A Gorton M.D. Engraving.
PUNCH, #46 Buffalo Forge Vert. Cap. 1"x1½" M.D.
PUNCH, R-4 Wiedemann Turret, 10 Stat. 24" thr.
PUNCH, Hecker Turret, 8 station, cap. 2½" hole.
PUNCH, H & J #2 Sgle. End, 24" Thr. 1" thru 1".
PUNCH, H & J #4, 48" thr., with Shear Blades.

RIVET SETTER, ⅜" cap. Penn Tubular Rivet.
ROLLS, Bertsch Pyramid 18'x1¾" cap., M.D., Late.
ROLLS, #1 Buffalo Forge Wrapping, M.D.
ROLLS, 72"x¼" Lown Initial M.D., New.
ROLLS, #2 Buffalo Forge Vert. Angle, Bending, New.

COLD SAW, Wagner 10"x10" cap., M.D.
COLD SAW, Espen-Lucas #700, 48" dia. blade, M.D.
CUT-OFF SAW, Yates-American #M-90, M.D.
SAW, #4B Marvel Hack Saw 6"x6" Cap., M.D.
SAW, #20-C Racine Shear Cut 6"x6" cap., M.D.
SAW, Band Tannewitz GH-36" High Speed, M.D.
SAW, V-26 DoAll Contour Band, Late.
SHAPER, 16" Pratt & Whitney Crank, M.D.
SHAPER, 20" Rockford Univ. M.D., Tilting Table.
SHAPER, G & E 24", high duty, back geared, M.D.
SHAPER, 32" Cinci., B.G., Motor Driven, H.D.
SHAPER, Morton, 36" Draw-Cut, 4 speed M.D.
SHEAR, #26 Buffalo Forge Slitting Armor Plate.
SHEAR, Quickwork #11 Rotary 60" Throat, 10 ga.
SHEAR, 10' x 10 ga. Wysong & Miles, M.D., New.
SCREW SLOTTER, #2 Waterbury Farrel Auto.
SLOTTER, 12" New Haven Vertical, M.D.
SPRU CUTTER, Milwaukee 56 tons, 2½ cap., M.D.
SURFACE PLATES & TABLES, all sizes.
TAPER, #1 Cam Haskins, Motor Driven, Late.
TAPER, #1 Bakewell (Warner & Swasey) Late.
TRUCK, 2000 lbs. Hyster Fork Lift 9' Model QT-20.
TRUCK, 4000 lbs. LT-44 Towmotor Fork, Lift 9'.
BRINELL TESTER MACHINE, Type UK300M.
BRINELL TESTER, Type 03DR, Steel City.
WELDER, 500 amp. Westinghouse Flexers A.C.
WELDER, 200 & 400 amps. Gen. Elec. Portable Arc.
WELDER, 75 KVA Federal M.D., Spot.
WELDER, 200 KVA Federal, Projection.
WIRE STITCHER, Marrion and Acme, M.D.

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BALANCERS

GISHOLT 12E Static, 1948.

BENDING ROLLS

SOUTHWARK 20'x1" Pyramid Type, Drop End, Balance Bar.

DRILLS

Avey 6-Spindle No. 2MA6 Power Feed, No. 2 MT, 12" Overhang, 1943.

BARNES No. 242 Single Spindle, No. 5 MT, Power Feed, 1941.

BARNES No. 201 Single Spindle, Lead Screw Tapping, Power Feed, 1941.

ALLEN No. 2 MS Single Spindle, No. 2 MT, Power Feed, 12" Overhang.

BAUSH No. 46 High Speed Multiple Driller, 1947.

GEAR EQUIPMENT

BARBER-COLEMAN Model A Gear Hobber, 1943.

FELLOWS 61A Gear Shaper, 1941.

PRATT & WHITNEY 10" Hydraulic, 2 Wheel Gear Grinders (2), 1941.

GRINDERS, CYLINDRICAL

CINCINNATI 10"x48" Model ER, Plain Hydr. Equip. for Plunge Grinding, 1941.

CINCINNATI 10"x36" Model ER, Plain Hyd. Equipd. for Plunge Grinding, 1942.

LANDIS 4"x18" Hydraulic, Plunge Grinding, Auto. Timer 1943.

NORTON 10"x18" Type C Hydraulic, 1942.

BROWN & SHARPE No. 5 3"x18" Plain with Plunge Grinding, 1943.

BROWN & SHARPE No. 5 3"x12" Plain with Plunge Grinding, 1941.

GRINDERS, MISC.

NORTON 6"x18" Hydraulic Surface, 2 available, 1942 and 1943.

HEALD No. 22 Rotary Surface, 12" Chuck, 1941.

LATHES, AUTOMATIC & PRODUCTION

POTTER & JOHNSON 5D Automatic Chucker with Air Chucking Equipment, 2 available, 1942.

SUNDSTRAND 12A Automatic Lathe, Air Equipment, 1951.

LODGE & SHIPLEY 3A Duomatic, 1946.

SENECA FALLS Model R-14 Lo-Swing, 1942.

SENECA FALLS Model LR Lo-Swing, complete, 1942.

LeBLOND 13" Rapid Production Lathe, 1200 RPM, 1945.

LATHES, TURRET

GISHOLT 1L Saddle Type Bar and Chuck, 1944.

MILLS

CINCINNATI 56-90 Plain Hydromatic.

KEARNEY & TRECKER 2K Vertical, 1943.

KEARNEY & TRECKER 2HL Plain, 1943.

KEARNEY & TRECKER Model 1H—18" Manufacturing Mill, 1941.

U. S. MULTI-MILLER MM-1-5-2 Rise and Fall, 1943.

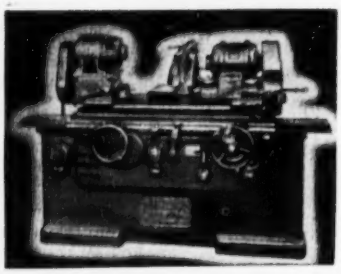
U. S. MULTI-MILLER MM-1-60, 1944.

No. 3 PLAN-O-MILL Thread, 1945.

MULT-AU-MATICS

BULLARD 12" 8-Spindle, Type D, with Power Chuck and Tooling, 1941.

FOR EXAMPLE . . .



CUSTOMER PROBLEM

In March of this year an AAAA manufacturer needed a grinder able to hold a .0002" tolerance. Delivery was vital as it was needed for the production line.

MacDELL'S SOLUTION

WITHIN 48 HOURS we had shipped to this customer a 1944 NORTON 6"x18" Plain Cylindrical Grinder, with the .0002" tolerance, at a SAVING OF 46% of the price of a new machine.

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A DEALER OF ESTABLISHED REPUTATION

#3½ Baker Keyseater

6" x 18" Norton Type C Cylindrical Grinder (Late)

#3L Gisholt Universal Turret Lathe with 6¼" hole thru spindle (1942)

#4A Warner & Swasey Universal Turret Lathe, Serial No. 418157

Model 3 Newark Universal Gear Hobber (1943)

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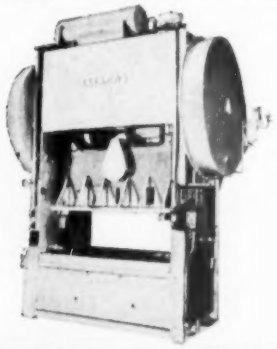

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No. 167 Toledo S. C. Toggle Drawing Press Plunger 21", Blankholder 13⅛", 250 Ton Cap.

No. 3 W.F.F. 4 Post High Speed Blanking Press, 2" Stroke, 200 RPM, M.D. Double Roll Feed, Scrap Cutter.

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Unusual opportunity to procure modern Fellows Gear Shapers 615A and 845 as well as 12" Gleason Generators, 36 BM Gould & Eberhardt Rougher, #7 Fellows Gear Shaper, #16 D. E. Whitton Machine. Write for full information.

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1941-1953 MACHINE TOOLS

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CAM MILLERS

VAN NORMAN: 10CT Contour Miller, horizontal opposed spindle type for milling flat cams, also can be converted to similar work

CENTERING MACHINES

SUNDSTRAND: 44" Double End Centering Machine

CUTTER & TOOL GRINDERS

FELLOWS: Flat Top Helical Gear Cutter Grinder
OLIVER: 10" Template Tool Bit
RANSOM: 2-Wheel Grinder 3 HP
RUSSELL: 40" Saw Sharpener (New) automatic indexing

DRILLING MACHINES

ALLEN: #2 High Speed, 15" overhang
PRATT & WHITNEY: ½B x 50 Deep Hole Drilling & Reaming Machine, 2-spindle
SUNDSTRAND: 44" Double End Centering Machine

GEAR CUTTING MACHINES

BROWN & SHARPE: No. 6 Gear Cutter, 72" diameter, 1¾ D. P. capacity
CLEVELAND: Model 130 Gear Hobber (like new)
CLEVELAND: Model 140 Gear Hobber (like new)
FELLOWS: 61A Shaper, 18" dia.
FELLOWS: 64A Shaper, 18" dia.
FELLOWS: 72 Shaper, 7" dia.
FELLOWS: Flat Top Helical Gear Cutter Grinder
FELLOWS: Straight Line Generator, 3" dia. with many cutters
GLEASON: #12 Rough & Finish Gen.
GLEASON: 3" Straight Bevel Gear
SYKES: Gear Shaper 14" external, 20" internal (New)
SYKES: Rack Cutting Machine 12" to 36" length capacity (New)

GEAR AND SPLINE GRINDERS

PRATT & WHITNEY: 10" single and double wheel, hydraulic feed
GEAR GRIND MACH: GG-19, 10"x 24" Hydr. Spur Gears and Splines

GEAR FINISHERS & TESTERS

FELLOWS: 8 LSI and 13 LSI Gear Lappers, external and internal spur and helical
FELLOWS: #12C Cone & Spacing Inspection Instrument
GLEASON: No. 4 and No. 6 Bevel Gear Testers. Hand and Power
NATIONAL BROACH: SIC-12" Red Ring Gear Testing Machine

GRINDERS—CYLINDRICAL

BROWN & SHARPE: No. 10 capacity 6"x18" plain
CINCINNATI, 6"x18" Hydraulic, Plain
LANDIS: 16x32" Type "D" Crankpin, hydraulic, for grinding crankshafts
NORTON: 10"x18" 45° angle wheel

3-WAY GUARANTEE

1. **Should any machinery purchased from us prove unsatisfactory, you can return the machines within 30 days, via freight prepaid to our plant, and a full refund will be made.**
2. **Machines at our plant can be demonstrated and tested under power before purchasing.**
3. **You are dealing with a well-established, highly-rated firm of machinery engineers with over 33 years of proven responsibility.**

GRINDERS—GEAR & SPLINE

GEAR GRIND MACH.: GG-19, 10"x 24" Hydr. Spur Gears and Splines
PRATT & WHITNEY: 10" single and double wheel, hydraulic feed

GRINDERS—INTERNAL

BRYANT: No. 5Y Internal
HEALD: 72A3 Sizematic Centerless

GRINDERS—RADIUS

VAN NORMAN: #73, capacity 7½"
VAN NORMAN: #639, capacity 7"
VAN NORMAN: #649, capacity 6" to 16" diameter
VAN NORMAN: #3½ Un. Radius

GRINDERS—THREAD

EXCELLO: #31 External, dia. 5"x18"
JONES & LAMSON: #636 Universal, 6" dia. x 36" centers and one extra multiform wheel dressing attachment

HONING MACHINES

MICROMATIC: H-510 Double End Horizontal, ¾" to 2" dia.
MICROMATIC: H-2 Single End Horizontal, 2-spindle, ¼" to 1" dia.

JIG BORING MACHINES

LINDNER #14 & #15 Jig Borers, new

LAPPING MACHINES

FELLOWS: 8LSI and 13 LSI Gear Lappers, external and internal spur and helical

LATHES PRODUCTION

BLOUNT: Polishing speed lathe 12" dia. x 48" centers
H.E.B.: High production hydraulic duplicating and copying lathes (new)
LODGE & SHIPLEY: #3A Duomatic. 25½" swing x 27" centers
POTTER & JOHNSTON: #6 DREL Automatic
PROGRESS: Geared head 16" to 30" swing (New)
New Engine Lathe 27" swing x 23' centers

LATHES—TURRET

WARNER & SWASEY 1A Turret Lathe
WARNER & SWASEY #3 Turret Lathe
HERBERT: #2, #4, #7, and #8 Sizes (new)
WEBSTER & BENNETT: Vertical Turret Lathes 36" & 48" (New)

MILLING MACHINES

TAYLOR-FENN: M-80 Duplex Spline
RICE-BARTON: Duplex Spline
VAN NORMAN: 10CT Contour Miller, horizontal opposed spindle type for milling flat cams, also can be converted to similar work

SAWS & CUT-OFF MACHINES

CAMPBELL: No. 425 Cutalator Abrasive Cut-Off, 4½" dia. capacity
MOTCH & MERRYWEATHER: No. 3 Circular Saw with auto. stock feed
RUSSELL: 9½" cut-off Saw with Auto. Stock Feed (New) Hydraulic
RUSSELL: 5½" dia. cut-off saws, auto stock feed, hydraulic (New)

THREAD MILLERS & TAPPERS

HALL PLANETARY: Model "D" Thread Miller
LANDIS: 2½" single head horiz. threading machine
LEES-BRADNER: 40A Thread Miller
MURCHEY: #22 Horizontal threading and tapping machine, ½" to 2½" dia. capacity, single spindle
NATCO: Vertical Tapper 16 spindle

WIRE FORMING MACHINES

BAIRD: 4-slide wire former
HEENAN & FROUDE: Wire forming, 4-slide machines (new)

MISCELLANEOUS

CENTERING MACHINE: Sundstrand, 44" Double End.
CUTOFF: Campbell, abrasive 425 Cutalator 4½" dia. Capacity
RACK CUTTING MACHINE: Sykes 12" to 36" length capacity (New)
CUT-OFF: Russell 5½ & 9½" cut-off saws with auto. stock feed (new) hydraulic
TEST STAND: Denison 918-AM Hyd.
LATHES: Blount Polishing Speed Lathe, 12" dia. x 48" centers
GOGAN BRINELL Hardness Tester Model 16-J
SHAPERS: Klopp 16 to 26½" (New)
SHAPERS: Hercules 16" & 22" (New)
WIRE FORMING MACHINES: 4-slides (new)

INSPECTION INVITED — Telephone HAnover 2-4520

TRIPLEX MACHINE TOOL CORP.

75A West Street, New York 6, New York **Cable Address TRIMACTOOL**

MACHINE TOOL ENGINEERS SINCE 1919

UNUSUAL LATHES for SPOT DELIVERY!

AMERICAN 36" x 33' centers geared head; high duty; heavy

LEHMANN 25" x 96" centers geared head; heavy; Timken

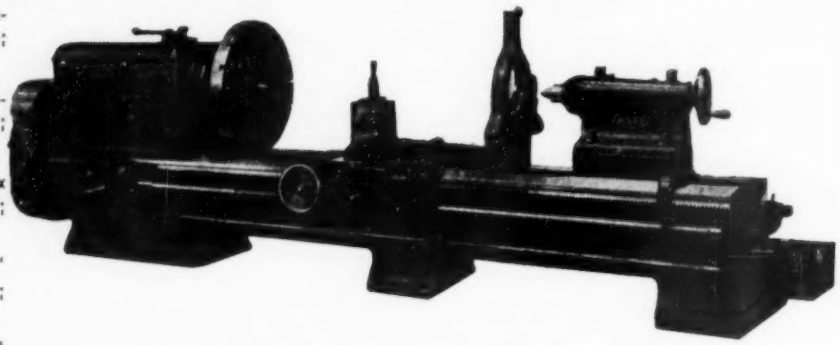
LODGE & SHIPLEY 24" x 96" centers; geared head; Timken; Late type

NILES 30" x 46' and 30" x 50' Single End Boring; Timken; Late type

LoSWING (SENECA FALLS) 8" x 108" centers; Production; steel ways; Late type

LeBLOND #16 Automatic Turning; hydraulic; Timken; Late type

and many others



NILES 27" x 96" centers "Time-Saver" Lathe
LATE TYPE

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AMERICA'S LARGEST STOCK

MOREY *...for machine tools!*

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LATE MODEL MACHINE TOOLS . .

AUTOMATICS
No. 656 New Britain Chucker, 1943
2" Model A Cleveland, 1941
1¾" Model A Cleveland, 1943
1-1/16" Model A Cleveland, 1943
No. 00G Brown & Sharpe, 1941

BROACHES
HP-100 La Pointe Hetz, Broach, 1945

DRILLS
No. 6 Avey 4 Spindle, H.F. 1943
Allen Single Spindle Drill & Tapper, 1942
No. 2 LMS Leland-Gifford H.F. 1942

GEAR EQUIPMENT
No. 7 Gleason "Revex" Rougher, 1943
No. 6 Gleason Revacycle Generator, 1940
No. 72 Fellows H.S. Gear Shaper, 1942
10" Pratt & Whitney Hyd. Gear Grinder, '42

GRINDERS, CYLINDRICAL
14"x168" Norton Plain Type "C", 1942.
10"x18" Norton Plain Type "C", 1940
6"x30" No. 12 B&S Hydraulic, 1940
No. 5 Brown & Sharpe Plain, 1941
No. 2 Cincinnati Centerless Grinder, 1944

GRINDERS, INTERNAL
No. 72-A3 Heald Plain Hydraulic, 1942
No. 24-36 Bryant Hydraulic, 1943
No. 16 CP 16 Bryant Hydraulic, 1942
No. 16-16 Bryant Hydraulic, 1942
No. 172 Heald Hydraulic, Gap, 1940

GRINDERS, MISCELLANEOUS
No. 16A Blanchard Auto. Surface, 1942
Cincinnati Centerless Lapper, 1942
No. 600 UK Hanchett Face Grinder, 1946
No. TG-636 J&L Thread Grinder, 1942
HRS Barber-Colman, 1942.

GUN BARREL MACHINES
No. ½ B x 50 P & W Reamer, Latest
No. ½ B x 30 P & W Reamer, Latest
No. ½ B x 50 P & W Rifler, Latest

LATHES, ENGINE
36"x296" American Geared Head, M.D.
27"x192" Niles Timesaver, 2 Carr, 1941
27"x132" Monarch Auto. Sizing, 1942
27"x196" Niles Timesaver, 1940
26"x180" Betts Bridgeford, 1940
26"x96" Betts Bridgeford, 1940
18"x80" Safep Gap Bed, Unused.
10"x20" EE Monarch Toolmakers, 1943

LATHES, PRODUCTION
No. 5D Potter & Johnston Automatic, 1943
8"x84" Lo-Swing Semi-automatic, 1941
Lipe Carbo-Matic Lathe, 1942

LATHES, TURRET
36" Bullard VTL, Spiral, Late.
No. 1A Warner & Swasey Saddle Type, 1941
No. 5 Warner & Swasey Ram Type, 1942.
No. 3R Gisholt Universal Saddle Type, 1943
No. H5 Libby Universal Saddle Type, 1939
No. 5 GISHOLT Universal Ram Type, 1942

MILLS
No. 1848 Milwaukee Duplex, 1942.
M-18 Milwaukee, 1943
No. 3 Cincinnati Univ. Dial Type.
No. 0B CINCINNATI Rise and Fall, 1942.

MILLS, TOOL ROOM
No. 3 Van Norman Plain, 1942
No. 2 Saimp Vertical, New
No. 2 Saimp Universal, New
No. 2 MI Cincinnati Plain, 1951
No. 2L Van Norman Plain, 1942

SHAPERS
16" Gernetti Universal Shaper, New
20" Gernetti Universal Shaper, New
18" Brook Universal Shaper, New
24" Gernetti Universal Shaper, New.

PRESSES
650 Ton Verson Dbl. Act. Eccentric, 1940
No. 166 Toledo Toggle Press.

Partial Listing — Write for latest stock list

INDIANAPOLIS *Machinery & Supply Co.*
1961 S. Meridian St. • • Indianapolis, Indiana

LATE TYPE MACHINERY

AUTOMATIC: Cone 3½" 4-Spindle. Serial No. 2696-AB (1940).

GRINDER: Excello No. 35 Thread Grinder. Serial No. 1180.

GRINDER: Bryant No. 16A28 Internal Grinder. Serial No. P4403.

LATHE: Boye & Emmes 18" x 84" Heavy Duty. Serial No. B58.

SHAPER: 20" Smith & Mills. Serial No. 11482 (1942)

FOSTER MACHINERY SALES CO.
18800 Hawthorne Detroit 3, Mich.
Twinbrook 1-0354

36" Bullard VTL with Side Head, MD, Older Type
32"x32"x8' Cincinnati Planer, Factory MD, Older
#3 Lodge & Shipley Duomatic Lathe, 15 HP
#39 Fred W. Swaine OBI Press, BG, 5" Stroke
#5 Bliss Styles Type Press, 56 Ton, 1½" Stroke
#6 Warner & Swasey Turret Lathe, Lima Drive
10' x 14 Ga. Dries & Krump Leaf Brake
Garvin Double End Hor. Drill, #4 MT, 3 Motors
#13-B Brown & Sharpe Production Mill, MD
#2i Brown & Sharpe Production Mill, MD
14" Hendey Lathe, 36" cc, Lima Drive

CARLSON MACHINERY CO.
125 Wabash St., Toledo 2, Ohio

SOME LATE MACHINES STILL AVAILABLE

BORING MILLS

Bullard 24" V.T.L., Spiral Drive
Cleveland 2½" Bar Capacity
Giddings & Lewis #32, 3" #25, 2½" Cap.
Kings 42", 72" Vertical 2 rail heads
Niles-Bement-Pond 4", 4½" Bar, 60" Vert.
Niles-Bement-Pond 60" Vertical
New 3" Horizontal Boring Mill

DRILLS AND RADIALS

Brand New Radials
American 6'x15" Universal
Baker No. 321 Vertical Boring & Drill
Bausch Multi-spindle
Buffalo #2 Motor Spindle, #16—4 Sp.
Buffalo: Power No. 41, No. 42
Canedy-Otto 21" Sliding head New
Cincinnati Bickford 6'x15" col.
Edlund 8" Model 2B, Sliding Head
Natco #12 20 spindle drill
24" Sibley Sliding head
New Geared Box Col. Drills 24'
Foote-Burt #25 3" capacity
Leland Gifford 2 LMS, 3 MS

NEW VERTICAL MILL

ENGRAVERS

Gorton #1A, ME, 1D, 3Z, Deckel G1L, G1, GK2
Taylor-Hobson 3 dimensional Pantograph

GEAR EQUIPMENT

Barber-Colman Mod. SHS. Sharpener
Barber-Colman #2, #12 (3)
Barber Colman Hobber Type S
Browne & Sharpe #3 Gear Mill, 26" Cap.
Fellows High Speed Shapers 712, 725, 71, 7
Fellows #20M Redliner, Flather 72" Cutter
Gleason #2 Surface Hardener, No. 3 Gear Tester
Gleason #3 Spiral, #3 Straight Bevel
Gould & Eberhardt 36" Cutter
Michigan Gear Finisher 24" cap., 862-24A
National Broach Red Ring Lapper, Finisher
Schuchardt & Shutte #1 Hobber

GRINDERS, MISCELLANEOUS

Browne & Sharpe #2 Universal 14"x28"
Brown & Sharpe #5, 3"x18" Cylindrical
Browne & Sharpe #3 Universal w/Internal Sps.
Browne & Sharpe #13 Universal Tool & Cutter
Bryant #5 Internal, chucking
Cincinnati 6x18" Hyd. #4—Centerless
Gardner Disc Grinder 30"—15 H.P. Motor
Grenby Models 1G1 & 1G2—Internal
Gorton Ped. Type Tool Grinder Mod. 375-2
Heald #73 Internal Centerless, Sizematic
Heald #81 Internal Gagematic
Heald 72A3 Int. Centerless Sizematic
Landis 6"x30" Type C Cyl., 10x24 Univ. 12x30
Norton Type C 6"x18" Semi-Automatic cyl.
Norton 10"x18" Type C cylindrical
Norton 14"x96" cyl., 16x48 Univ.
Norton Roll Grinder 50"x28'
Oliver #510 Drill Pointer
Pratt & Whitney Radius Model R6
Rivett Internal with External Sps. Model 104
Sellers 6-G Drill Grinder
Sellers 69 Tool K.O. Lee tool
Van Norman #666 Crankshaft
Wicaco Internal

NEW IN STOCK

Air Hydraulic Presses — Arbor Presses #6C Famco — Band Saws Johnson Kalamazoo — Famco 6x12" — Drill Presses all sizes—Hydraulic Press Northern 20 Ton—Injection Molders, 1 ounce—Power Presses, OBI, 1, 4, 4½, 5, 7½, 10, 15, 20, 30 55, 85 ton—Shapers, 7", 8", 14", 18" Shaperite—Shears, Foot 22" to 8', 16 & 18 ga.—Shears Power 3'x18 gauge to 10' x 10 ga.—Welders, Arc, Seam, Spot, all sizes Motors Grinders Buffers.

AUTOMATIC SCREW MACHINES

Brown & Sharpe (2) Model 2G, serial No's. 8500 series, 1¼" capacity.
Brown & Sharpe (9) Model 0G, serial No's. 9600 & 10700 series, 5/8" capacity.
Brown & Sharpe (6) Model 00G, serial No's. 14, 15, 16 & 17000 series 3/8" capacity.
Ceco Screw Machine 3/8" capacity.
Cleveland, Model AA-11, Serial #36586.
Cleveland Model B. Serial #42618/843, 1-1/16" capacity.
Conomatic 4 Spindle, Serial 2309FF, 1½"
New Britain Gridley 61 6 Spindle, Serial No. 25410, 1⅜" capacity.

GRINDERS, SURFACE

New 8x24" Hyd. Feed, 10x18", 6x18"
Abrasive 8x24", #33 Vert. & #34
Blanchard #16, 26" Mag. Chuck
Browne & Sharpe #5, #2 with Chuck
Heald 22—12" chuck, Arter 12", Covel No. 15,
Norton 6x18" Hydraulic Vertical
Portman 12" Chuck Rotary
Pratt & Whitney 12x36" Vertical
Thompson Hyd. 8"x24" Hor., Spindle
Taft Pierce #1 Precision

LATHES

American 14"x30", Bridgeford 36"x20', 32"x16'
Gisholt Simplimatic 18"x16½, 2 Tables
Hendey 12"x42" and 12x30", 1941
Hendey 14" Yoke Head Lathes
LeBlond Regal 10"x3' bed, 13x42", 17"x30" Late
LeBlond 25/50x96" Gap, Late type.
Lipe-Carbo 12"x18" (2)
Lodge & Shipley #3A, Duomatics
Pratt & Whitney 16"x60, 10"x20", 16"x36
Monarch Magna-matic 14"x54"
New 16, 18, 20", 28" Immediate Del.
New Tool Makers 10x24", South Bend 9"
Reid Small Piece #9WSL, Sheldon 12"
Rivett Model 918 Precision. Mod. 715
Putnam, Sliding Gap 22"/46"x92"
Sundstrand 8x15", 15' Stub
Wickes 32"x35' Geared Head

MILLS, PLAIN, UNIV. PROD.

Brand New Universal Mills No. 1, No. 2
Archdale Plain, 14" Production
Brown & Sharpe #3B Plain. No. 2, 3A, 21, #2L
Cinn. No. 3, 4 Plain Spd., 18" Manufacturing
Kent Owens IV, 1-8, 1-14, 1M
Kempsmith #1 Pl., Vert. & Div. Hd.
Milwaukee 2H Univ., 2H Plain.
Milwaukee #2B, Plain & Univ.
Sundstrand #00, 0, Rigidmils
Sundstrand #3A Rigidmil with copying Attach, 33
Van Norman #2L Univ., Dividing Head

MILLS, VERTICAL

Brand New Vertical Mills
Cincinnati 2 Spindle Hydromatic
Cincinnati (2)—1-18 Plain Automatic
Cincinnati #3, #4 hi-power, 08 Vertical
Cleveland No. 1, table 8"x32"
Morey #12M Profiler, 2 sp. 2 Maximiller.
Reed Prentice Vert. Mill & Die Sinker Mod. 3VG

PRESSES

Bliss No. 1 Double Action Drawing Presses
Bliss 645, 650 Hi-Production Presses
Bliss 18, 19, 21, OBI, 58, 62, 162, OB
Bliss 4½ Double Action, Roll Feeds, Cam (2)
Bliss #78½, 330 Ton 55, Bliss 74½
Bliss 5-48 Dbl. 32x48" bed, Cushion
Hamilton 850 Ton S.S. Bed 27x48
Hamilton 110 FM Die Tryout Press
New 85, 60, 55, 30, 20, 15, 10, 5 Ton O.B.I.
Niagara Horning, 15 Ton—Toledo 32 Ton Honing
Niagara A1¾, O.B.I., Niagara No. 27
Stokes Tablet Press, type R, Late, Model F
Toledo 92½c Double Crank 43x23" bed
Toledo 29 Double Action Cam
V. & O. #102 O.B.I. Reducing
Walsh No. 3 O.B.I. 23 Ton, LI #3
Z & H #4½, O.B.I. 20 Ton

TURRET LATHES

Acme 6W Fox 2-916" Cap. #2 Cross Slid. Turret
Bardons & Oliver #2, 3, 5, 7, Bar Feed
Brown & Sharpe, #2 Hand, #10, 11
Denver 6 2" Shell Turret (2)
Foster #2B 2½" Cap. Morey #2G Late
Gisholt 2L, Cross Slid. Tur.
Gisholt #5, Bar Feed, Plenty of Tools
Gisholt 4R—9¼" hole in spindle
Jones & Lamson No. 5 Bar Feed
Libby 1HS with threading att.—3R, 4R
Oster 601 WD. #2 Simmons Microspeed
Warner & Swasey #1, 1A, 2, 3, 4, 5

MISCELLANEOUS

Band Saw: New Kalamazoo & Johnson
Bolt & Pipe Threader: Landis, Oster-Williams
Boring Bar: Underwood 4"
Broach: New 6 Ton, Horizontal, 11 Ton Vertical
Hacksaw: Peerless 6"x6", Racine 6"x6"
Hand Mill: Whitney
Hoist: 5 ton capacity 7½ HP motor
Honer: Micromatic H-4, MC1H—Sunnen—Mod. MA
Jig Borers: New Swiss
Keyseater Davis, Baker
Oil Groover: WICACO
Pipe Bender, Kane & Roach, Vari-drive
Planer: Niles-Bement-Pond 36x36'x10'
Rotary Table: Cincinnati, power take-off
Saw: Shaping 6x6", 13x13"
Scrap Cutters & Granulator: Ball & Jewell
Shapers: 24" Rockford, 24", 28" Gould & Eberhardt, Cinn. 20, 24", Columbia 36"
Shears Power, 10' 3/16", 10" x 16 gauge
Vertical Milling Att. New, Bridgefield
Tapper: Haskins—2C, 1A, Bakewell #2
Welder 50 KVA Eisler Air Operated, New Seam.
Welder: Taylor-Winfield 50 KVA Hi-Wave

New Lathes 16" to 28", Mills, Boring Mills, Broaches, Shears & Presses

HYDRAULIC EQUIPMENT

8 and 9 oz. Injection Moulders
125 Ton Southwark Press, Bed 96"x30". 30" stroke, 2 to 4 ft. opening
150 Ton Triple Action HPM Press
200 Ton W.F. Hobbing Press
250 Ton Watson & Stillman 28x24"
300 Ton Watson & Stillman 24x29"
300 Ton Watson Stillman 20"x20" Platen 8" St. 19" opening
600 Ton Williams & White 42"x60"
800 Ton Williams & White 42"x60"
800 Ton W&S Hobbing Press
All Hydraulic Equipment is completely engineered and checked by a competent staff thus assuring reliability.
Send us your Hydraulic problems.

AARON MACHINERY CO., Inc.

This is but a partial listing. Write for free Catalog. Inquiries invited. HUNDREDS OF OTHERS

AARON MACHINERY CO., Inc., 45 Crosby Street, New York 12, N. Y.
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an exceptional stock of PRECISION MACHINE TOOLS

BORING MILLS

24" Bullard Spiral Drive Vertical Turret Lathe—1942

100" Betts Heavy Duty Vertical Boring & Turning Mill

GRINDERS

6"x18" Landis Type C Plain Cylindrical—Plunge Cut—Automatic Cycling

6"x30" Norton Semi-Automatic Plain Cylindrical — Hydraulic Rapid Infeed — reciprocating spindle

10"x36" Landis Type C Hydraulic Cylindrical—1941

14"x36" Norton Type C Cylindrical—Hydraulic Plunge—1943

#81 Heald Plain Chuck Type Internal—1941

#73 Heald Airplane Cylinder & Sleeve—1942

12"x36" Norton Type "L" Universal—1941

10"x24" Landis Type C Hydraulic Universal—1939

#186-30" Gardner Horizontal Disc—1939

#95-110" Bridgeport Face Grinder—1943

LATHES

12"x30" Model C Monarch Geared Head Toolroom—1940

14"x30" Reed Prentice Sliding Gear Head Engine—1939

16"x48" Bradford Geared Head Quick Change—1940

16"x78" Monarch Model W Engine

MILLERS

#10 Brown & Sharpe Plain—1941

18" Cincinnati Plain Manufacturing Type—1941

#2H-24" Milwaukee Manufacturing Type—1940

#1218 Milwaukee Simplex—1941

#1854 Milwaukee Duplex—1942

FV5MZ Skoda Vertical—Table 31"x91⅜"—1942

4½"x12" Model C Pratt & Whitney Thread Miller

6"x36" Model LT Lees Bradner Thread Miller—1940

PRESSES

#59 Niagara Single Crank, single geared, Straight Side, Tie Rod, Bed 31"x27", stroke 3"

200 ton HPM Fastraverse Double Action—Stroke 18"—bed 48"x48" New 1944

TURET LATHES

#3 Gisholt Universal—1942

#4 Gisholt Universal—Bar feed—preselector head—1940

#1L Gisholt Universal—saddle type—1942

#2L Gisholt Universal Saddle Type—1941

#1 Warner & Swasey Electric Head—1944

#1A Warner & Swasey Saddle Type—Bar Feed—1939

#2A Warner & Swasey Saddle Type—Bar Feed—1941

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BRIDGEPORT 5A, CONN.
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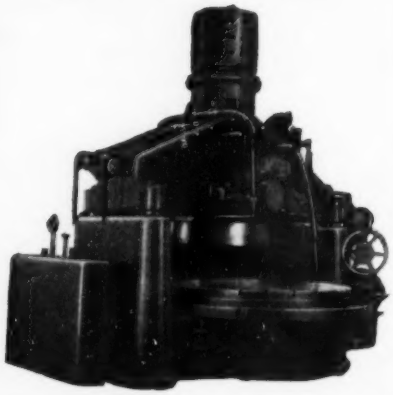
CABLE — "LUCASTOOLS"

EMERMAN *offers from* STOCK

LATE TYPE UNUSUAL ROTARY SURFACE GRINDER OFFERED IN EXCELLENT OPERATING CONDITION

84" LUMSDEN ROTARY SURFACE GRINDER SERIAL NO. 1-3025

Table diameter 84"
Wheel diameter 44"
Grinding capacity diameter 88"
Max. height under wheel 15"
Table speeds 4 to 1 RPM
Feeds coarse range .02"-.002"
Feeds fine range .005-.0005"
Spindle 425 RPM
Spindle motor 50 H.P.
Table Motor 7½ H.P.
Feed Motor 7½ H.P.
Pump Motor ½ H.P.
Floor space 17'1"x 11'8"
Approx. weight 24 tons



EMERMAN MACHINERY CORP.
879 W. 120th STREET — CHICAGO 43, ILLINOIS

PRESSES

125 Ton Bliss #6 Cupping Press Bed 24"x32", Double Action, Roll feed & Scrap Cutter (1942)

250 Ton Verson (3) Continuous (1942)

350 Ton Southwark Hyd. (less pump)

500 Ton Woods Hyd.—Bed 8'x6' clear.

800 Ton Wat. Still Hyd.—Bed 6'x12' (1942)

2500 Ton HPM—Hyd. Bed 6'x8' (1942)

KINGS COUNTY MACHINERY EXCHANGE
408 Atlantic Ave., Brooklyn 17, N.Y.
TRiangle 5-5237

No. 2 B & S High Speed Autos. M.D.
No. 25 Heald Rotary Surface Grinder.
P & W 30" Vert. 2-spindle Profiler.
Peerless 6½" x 6½" Hack Saw, hyd.

D. E. DONY MACHINERY CO.
4357 St. Paul Blvd., Rochester 17, N. Y.

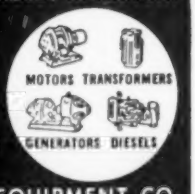
FOR SALE

Double wing tangent bender with solid dies for crowned cabinet 32" wide, 19" deep with 3" corner rad. Fully automatic hydraulic cycling with push button control.

14 ft. long press brake dies also available for triple front flange on above cabinet.

AMANA REFRIGERATION, INC.
AMANA, IOWA

WORLD'S LARGEST INVENTORY
NEW AND GUARANTEED REBUILT EQUIPMENT



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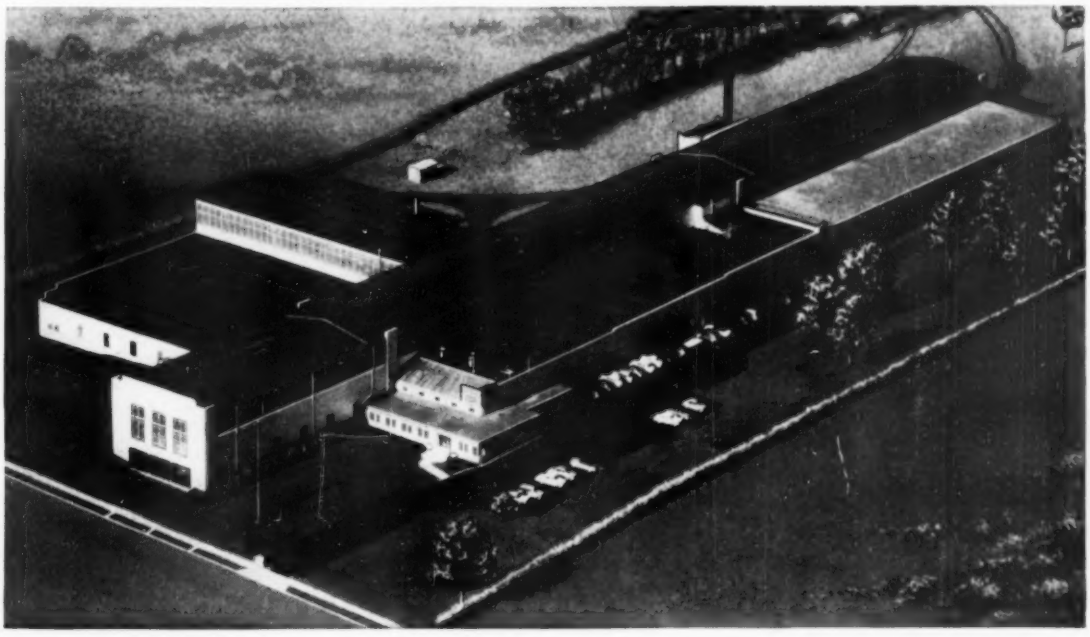
Explosion Proof Motor Headquarters

Eastern Rebuilt Machine Tools

THE SIGN OF QUALITY — THE MARK OF DEPENDABILITY



HAMMERS

1100# Chambersburg Single High Frame Steam Hammer

HONING MACHINES

H1 Micromatic Horizontal Hydrohoner, m.d.
H4 Micromatic Horizontal Hydrohoner, m.d.
No. 6 Barnes Twin Spindle
Model #182 Barnesdrill Hone, m.d., latest

MANUFACTURING LATHES

Model B1—3/4 H.P. Blount Speed Lathe, m.d.
W. C. Lipe Carbomatic Lathe, m.d.
Colborne Mfg. Bench Type Speed Lathe, m.d.
No. 4 LeBlond Boring Lathe, 37' bed, 4" hole, m.d., latest
No. 9, No. 12 LeBlond Multi-Cut, m.d.
3½x36", 3½x80", 4x60", 8x84" LeSwing, m.d.
8x132" LeSwing, m.d., latest
9x12" Sundstrand, s.p.d.
11x18" LeBlond Rapid Production, m.d.
12x18" centers Monarch Model 5T, m.d.
Schauer Type NA 2B Speed Lathe, m.d., latest
30"x10' LeBlond Turning Lathe, cone

ENGINE LATHES

12"x6' Lodge & Shipley Geared Head, m.d., taper
13"x5' bed Willard, cone, motorized
14"x6' American High Duty Geared Head, m.d., taper
14"x6' Hendey Geared Head, m.d., taper
14"x6' Lodge & Shipley Geared Head, m.d.
14"x6' Lodge & Shipley, cone, motorized
14"x6' Pratt & Whitney, cone
14"x6' LeBlond, cone
14"x6' LeBlond Geared Head, s.p.d.
14"x6' bed Monarch
14"x6' Sidney Geared Head, m.d.
14"x6' Springfield Geared Head, m.d., taper
14"x8' Sidney Geared Head, m.d.
14"x8' Prentice, m.d., taper
16"x6' bed Cisco Geared Head, m.d.
16"x6' Hendey Geared Head, m.d.
16"x6' Hendey Yoke Head, taper
16"x6' Lehmann Geared Head, m.d.
16"x6' Lodge & Shipley Selective Head, m.d.
16"x6' Lodge & Shipley, cone
16"x6' bed Monarch Geared Head, m.d.
16"x84" Pratt & Whitney Type B, m.d.
16"x8' bed Reed-Prentice, cone, taper
16"x8' Monarch, cone, motorized
16"x12' bed LeBlond Geared Head, m.d., taper
17"x6' LeBlond Geared Head, m.d.
18"x5' LeBlond Geared Head, m.d.
18"x6' bed Lodge & Shipley, cone, motorized
18"x6'6" bed Greaves-Klusman Geared Head, m.d. in leg
18"x7' Hendey Geared Head, m.d., taper
18"x8' bed American Geared Head, m.d.
18"x8' Hendey Geared Head, m.d., taper
18"x8' Lodge & Shipley Geared Head, m.d.
18"x8' Whitcomb-Blaisdell Geared Head, s.p.d.
18"x8'6" bed Walcott, cone, motorized
18"x10' bed Boye & Emmes, m.d.
18"x10'6" bed, Boye & Emmes, cone, motorized
19"x10' bed LeBlond, H.D., m.d.
20"x8' Cisco, cone, motorized
20"x8' bed Greaves-Klusman Geared Head, m.d., in leg
20"x8' bed Boye & Emmes, m.d.
20"—40"x9' bed Rahn-Larmon Gap Lathe, cone, motorized
20"x10' Sidney Geared Head, m.d.
20"x10'6" Boye & Emmes, cone, motorized
21"x8' bed LeBlond Geared Head, m.d., taper
21"x10' LeBlond Geared Head, m.d.
21"x12' bed LeBlond Geared Head, m.d., taper
23"x12' LeBlond Geared Head, m.d., taper
23"x12' bed LeBlond, cone, motorized
23"x14' bed LeBlond Geared Head, m.d., taper
24"x12' bed Boye & Emmes, belt drive
24"x12' Bridgeford Geared Head, m.d., taper
24"x13' bed Lehmann Geared Head, m.d.
25"x10' bed LeBlond Geared Head, m.d., taper
25"x10' bed LeBlond Geared Head, m.d.
25"x12' bed Geared Head, LeBlond, m.d., taper
25"—50"x6' centers LeBlond Gap Lathe, m.d.
30"x12'6" Niles-Bement-Pond, variable speed m.d., taper
30"x13'6" bed Niles-Bement-Pond, m.d.
30"x15' bed American Geared Head, m.d.
30"x—44"x15' bed American Geared Head, m.d.
36"x12' bed Lodge & Shipley Selec. Head, m.d.
36"x16'6" bed Boye & Emmes Geared Head, m.d.
42" Putnam (raised to swing 50½") x 20' bed Geared Head, m.d., 11'8" centers
42"x180" American Super Productive Lathe, m.d., taper

HAND MILLING MACHINES

No. 3 Garvin, m.d.

UNIVERSAL MILLING MACHINES

No. 2½ LeBlond Heavy Duty, cone, motorized

PLAIN MILLING MACHINES

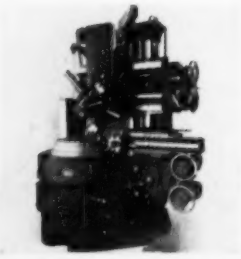
No. 1B Milwaukee, m.d.
No. 2 Rockford, m.d.
No. 2G LeBlond, belted m.d.
No 4 Ohio, cone

IN ADDITION TO THE ABOVE, WE ALSO HAVE IN STOCK AUTOMATICS, BOLT THREADERS, HORIZONTAL AND VERTICAL BORING MILLS, BROACHES, RADIAL DRILLS, BALL BEARING DRILLS, HORIZONTAL DRILLS, MULTIPLE SPINDLE DRILLS, UPRIGHT DRILLS, GEAR MACHINERY, GRINDERS, RAILROAD MACHINERY, PLANERS, PRESSES, SAWS, SHAPERS, TURRET LATHES, ETC.

WRITE FOR COMPLETE STOCK LIST.

THE EASTERN MACHINERY COMPANY
1004 Tennessee Avenue, Cincinnati 29, Ohio
MElrose 1241
CABLE ADDRESS
EMCO

HEADLINERS



38/44" Niles-Bement-Pond Vertical Turret Lathe, side head, p.r.t., 4-jaw chuck table a.c. m.d.

LATHES

17"x30" ctrs. LeBlond Regal, taper, latest
20"x72" ctrs Lodge & Shipley Selec. Grd. Hd., a.c. m.d.
22"x74" ctrs Lodge & Shipley Selec. Grd. Hd., a.c. m.d., taper
24"x60" ctrs American Heavy Patt. Grd. Hd., a.c. m.d., taper
36"x96" ctrs Schumacher & Boye Triple Grd., cone, taper
36"x120" ctrs American Grd. Hd., a.c. m.d., taper

MILLING MACHINES

No. 4 Cincinnati High Power Universal, a.c. m.d., div. hds.
No. 4-B Brown & Sharpe Heavy Plain
No. 1224 Milwaukee Simplex, late type

GRINDERS

10"x18" Norton Plain, a.c. m.d.
10"x24" Landis Plain Self-contained, a.c. m.d.
10"x48" Landis Type C Plain Hydraulic, late
No. 13 Brown & Sharpe Universal & Tool, late
No. 49-53" Besley Vert. Spindle Disc
No. 81 Heald Internal, chucking, Size-matic, Gage-matic

PLANERS

30"x30"x8' Cincinnati, a.c. m.d.
36"x36"x10' Cincinnati, a.c. m.d., box table
42"x42"x14' Niles-Bement-Pond Heavy Patt., d.c. m.d.
42"x42"x16' Gray, arr. m.d.

MISCELLANEOUS

36/44" Niles-Bement-Pond Vert. Turret Lathe
EF Cleveland Punch & Shear, 1¼"x1", 48" throat
No. 7 Fellows High Speed Gear Shaper
No. 1-A Warner & Swasey Univ. Turret Lathe, a.c. m.d., Timken, covered ways
Model A-3-6 Sturdybender Press Brake, a.c. m.d., 8'x12 ga.
42" King Vert. Boring Mill, a.c. m.d., p.r.t.
7"x7" Peerless "Mechani-Cut" Saw, a.c. m.d.

Many other machines in stock. Send us your inquiries.

COX MACHINERY COMPANY, INC.

3 MINUTES FROM THE CINCINNATI HOTEL DISTRICT

P. O. BOX 1953 CINCINNATI 1; OHIO

Office&Warehouse 311-313 Bakewell St.,Covington,Ky.

TIME TO REBUILD YOUR OLD MACHINE

Yes, the time to rebuild your old equipment is now. The place to have it done is the Worcester Automatic Rebuilding Company. We have skilled workmen and eningeers who specialize in rebuilding old machines—make them new again to meet exactly the needs to do a particular job . . . and do it right. The entire job from start to finish is tailor-made to solve your production problems.

Now, if you want to rebuild your old equipment and have it the way you want it and delivered when you need it—then see us. All our *engineered* rebuilt machines will add up to time-saving, money-saving performance every time.

We take your old machine, strip it down to the bare casting—clean it—replace worn parts and refinish sliding surfaces like new again. All machines are carefully tested and guaranteed.

Let us handle your Machine Tool Rebuilding and Motorizing Problems. We will be glad to quote phase 1 & 2. Every inquiry is handled competently and promptly. Simply write to address below.

WORCESTER AUTOMATIC REBUILDING COMPANY

91 WEBSTER STREET, WORCESTER 3, MASS.

Precision Machine Tool Rebuilding • Motor Drive Engineering

20"x96" MONARCH H.D. Model "M" Engine Lathe
30"x16' bed AMERICAN High Duty Geared Head Lathe
42"x15' AMERICAN Heavy Duty Lathe
42"x25' centers AMERICAN Heavy Duty Lathe
No. 172 HEALD Gap Internal Grinding Machine for large swing
6"x18" LANDIS Type C Plain Grinder
10"x72" LANDIS Type C Hyd. Pl. Grinder—1942
Nos. 4D and 6S POTTER & JOHNSTON Automatic Lathes
No. 9A JONES & LAMSON Saddle Type Universal Heavy Duty Turret Lathe
No. 0-8 CINCINNATI Plain Milling Machines
No. 2M CINCINNATI Vertical Miller, 1941
No. I-18 CINCINNATI Plain Mfg. Miller
No. 36 VAN NORMAN Plain Ram Type Miller
No. 12 B&S Plain Bed Type Production Miller
4½"x36" P&W Model C Thread Miller
6"x60" P&W Model C Thread Miller
36"x36"x12' INGERSOLL Planer Type Milling Machine—3 heads—late
Type A BARBER-COLMAN Gear Hobber
No. 64 FELLOWS Gear Shaper
No. 72 FELLOWS High Speed Gear Shaper
No. 12 FELLOWS Gear Shaver, 1943
No. 36BM GOULD & EBERHARDT Gear Rougher
16 20" GOULD & EBERHARDT Industrial Shaper
100" BETTS Vertical Boring Mill, 2 heads
Nos. 0G and 2G B&S High Speed Automatic Screw Machines.

WIGGLESWORTH INDUSTRIAL CORPORATION

203 Bent St., Cambridge 41, Mass.

LATE MODEL MACHINES

#2 Warner & Swasey Electric Turret Lathe. Late model.

4"x12" type H Landis Cylindrical Grinder, 1944.

6 DRE Potter & Johnson Automatic Turret Lathe.

Worthington duplex Air Compressor. 665 CFM, 125 h.p. Very little use.

All the above items are in excellent condition.

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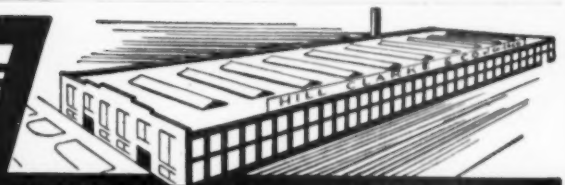

ESTABLISHED 1867 • H. W. MONS, President • W. L. DITFURTH, Vice-President • T. H. PRICE, Secretary

24" SWING x 144" CENTERS NORTON GRINDER GAP 35" SWING x 18¾" WIDE Photographed at our plant where it can be inspected.

AUTOMATICS
1-1/16" Model A Cleveland (1942)

DRILLS
1 Spdl—14" Sw—No. 2 Avey Cam Fd.
2 Spdl—24/ Sw—No. 3 Avey
12 Spdl. D-31 Fox, No. 2 Taper

GEAR MACHINES
No. 12HS Gould & Eberhardt Hobber
11" Gleason Bevel Gear Generator
No. 64 Fellows Gear Shaper
No. 36-BM G & E 3 Spdl, Rougher
No. 612-A Fellows Gear Shaper
No. 615-A Fellows Gear Shaper
No. 65 Fellows—Cone Dr.
8" cap Red Ring Gear Lapper

INTERNAL GRINDER
No. 5-B Bryant Internal Grinder
Swing 6½". Traverse 2¾". Recommended bore range ⅛" to 2", swivelling work head for taper. Inspect at our plant.

GRINDERS
6" x 18" Landis (1942)
6" x 18" Norton Cylindrical (1943)
Hill-Clarke Cylindrical Grinders
10"x36" centers
10"x72" centers
18"x96" centers
24x32 Gap x144" centers
14"x36" centers 14"x72" centers
14"x96" centers 18"x96" centers
20"x96" centers
No. A-3—12" Arter Rotary Surf.
No. 22—12" Heald Rot. Gdr. (1944)
No. 1109 Bryant Internal Grd. (1951)
(9" swing—1" bore x 3½" grind stroke)
No. 5 Bryant Internal Grd.
No. 5B Bryant Internal Grd.
No. 16-16 Bryant Internal Grd.
No. 16 A-16 Bryant Internal Grd.
No. 16-28 Bryant Internal Grd.
No. 16 A-28 Bryant Internal Grd.
No. 16 F-28 Bryant Internal Grd.
No. 24-26 Bryant Internal Grd.
No. 24-36 Bryant Internal Grd.
No. 81 Heald Centerless Internal
No. 74 Heald Internal Centerless

LATHES
16"x33" R-14 Seneca Falls Auto. Lathe
19"x8' LeBlond Hvy. Duty Lathe
27"x12' American Geared Hd. Lathe
36"x18' Putnam Grd. Hd. M.D.
5W Acme Ram type Tur., 2" Capacity
No. 6 Warner & Swasey Tur.-Bar Fd.
18" Libby Tur. Lathe, M.D.

FULL MONEY-BACK GUARANTEE

1. Hill-Clarke always give you an unconditional money-back guarantee.
2. All machines in stock.
3. You can see your machine run and tested under power in our plant before purchasing.
4. Complete and modern facilities plus experienced craftsmen for REMANUFACTURING machine tools in our 58,000 sq. ft. plant.
5. A responsible organization—with 86 years' experience.

No. 3AL Gisholt Cross-Slide Tur.
No. 4A Warner & Swasey—7½" Hole—Spdl.

MILLING MACHINES
No. 08 Cincinnati Vert. Mill (1942)
54"x30"x16' Ingersoll Slab Mill
6"x168" Pratt & Whitney Thrd. Mill
10"x48" Hanson-Whitney (1942)
10"x60" Pratt & Whitney Thrd. Mill
12"x102" Lees-Bradner Thrd. Mill

No. 2 AVEY CAM FEED DRILL, for long run production; 1½ HP AC Motor, 14" Swing, distance Spindle to table 31".

PLANERS
36" x 36" x 12' Cincinnati, 2 hds.
48" x 36" x 14' Gray, 2 hds.
48" x 48" x 12' Cincinnati, 2 hds.
60" x 48" x 27' American, 4 hds.

MISCELLANEOUS
1"-2" Dia. Cap. Micro. Hor. Hone—#200
¼"-1" Dia. Cap. Micro. Hor. Hone—#H-2
42"—18 gage Economy Power Shear
75 Ton R & K Straight Side Press
3 Ton Fox Hydraulic Press
2—12"x96" Magnetic Chucks
20'x1" cap Southwark Roll
15" Dill Slotter
18" Dill Slotter
38" Morton Draw-Cut Shaper (1945)
No. 0 Bakewell Tapper

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651 WASHINGTON BOULEVARD, CHICAGO 6, ILL. PHONE CEntral 6-0500

• LATHE CHUCKS •

• COMPARE THESE PRICES •

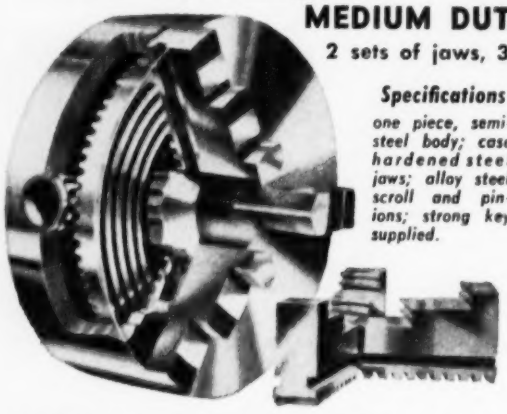
ACT QUICKLY WHILE OUR STOCK LASTS

BRAND NEW • ABSOLUTELY GUARANTEED

• RUGGED CONSTRUCTION

IMMEDIATE DELIVERY FROM STOCK

These lathe chucks, manufactured in England are equivalent in all respects to chucks selling here for two and three times the price. All are absolutely guaranteed with respect to accuracy, workmanship, and strength.



MEDIUM DUTY 3 JAW UNIVERSAL CHUCKS

2 sets of jaws, 3 pinions, for use with intermediate backplate.

Specifications *one piece, semi-steel body; case hardened steel jaws; alloy steel scroll and pinions; strong key supplied.*

Size	Weight	Price	Price Soft Jaws
2¾"	2½ lbs.	$ 25.00	$ 5.00
3¼"	3½	26.50	6.50
4"	6½	30.00	7.50
5"	12	37.50	9.00
6"	17½	45.00	10.00
7½"	29	57.50	13.50
9"	42	67.50	15.00
10½"	62	95.00	20.00
12"	88	125.00	22.50
15"	143	175.00	25.00
18"	200	250.00	35.00
24"	324	325.00	45.00

Steel body chucks are also available in some sizes.
Soft jaws and spare parts are immediately available from New York stock.

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BARR-ing NONE...*Here is the best!* FOR SALE FOR RENT

AUTOMATIC: CECO 3⅛", 1942

BORING MILL: BULLARD 36", V.T.L., 1942

BORING MILL: NILES BEMENT POND, 100"

DRILL: SIBLEY 25", #5MT, 1944

DRILL: NATCO, 12 Spindle #3 M.T.

DRILL, RADIAL: CARLTON 3 Ft., 11" col, 1945

DRILL, RADIAL: AMERICAN 6' 17" Col.

GRINDER, CYL: NORTON 10"x18", 1942

GRINDER, CYL.: CINCINNATI, 10"x48", 1941.

GRINDER, INTERNAL: Heald No. 70-A, 1942

GRINDER, TOOL & CUTTER: NORTON No. 2 Universal, 1943

LATHE, AUTOMATIC: POTTER & JOHNSON No. 5D, 1941 (2)

LATHE, AUTOMATIC: SUNDSTRAND No. 8, 1942

LATHE, TURRET: GISHOLT No. 4, Chucker, 1945

LATHE, TURRET: GISHOLT #1L, 1945.

LATHE, AUTOMATIC: SENECA FALLS, #R-14, 1942.

LATHE: AMERICAN 18"x72" T.A., 1937

LATHE: HARDINGE 9"x16" Toolmakers, 1942

LATHE: MONARCH 18"x48" T.A., 1945

MILL, PROD: KENT-OWENS No. 1-14, Hyd., 1942

MILL, VERT: KEARNEY & TRECKER No. 3K, 1937

We have 25 years of experience in supplying the machines you need. Every machine that leaves our shop is guaranteed for first-class service.

• *To Save Time—let us send you photo of machine*
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MODERN MACHINES

7" Bar Niles-Bement-Pond No. HM5 Floor Type Horizontal Boring, Drilling & Milling Machine—Serial #11977.

Cincinnati #3 HI-POWER Vertical Miller Serial #E649H—Rebuilt and guaranteed.

Heald #25A Rotary Surface Grinder—Serial #4577 Reconditioned and guaranteed

3'9" Column Cincinnati Bickford Radial Drill Serial #2A-41—new 1936—Rebuilt & guaranteed

72" King Heavy Duty Vertical Boring and Turning Mill—Serial Lot 38-#175 Rebuilt & guaranteed

4½" Bar Giddings & Lewis #45 Table Type Horizontal Boring, Drill and Milling Machine—Serial #8150. Reconditioned & guaranteed

Ingersoll Adjustable Rail Planer Type Milling Machine—Serial #3158—Reconditioned and guaranteed

#64 Fellows Gear Shaper Ser. #26113

#6A Fellows Gear Shaper—Ser. #25634

60" Hanchett Face Grinder—Reconditioned and guaranteed

6D Potter & Johnston Automatic Chucking Machine Serial #70393

16" Gould & Eberhardt Shaper—Ser. #66737

HAZARD BROWNELL MACHINE TOOLS, INC.

350 Waterman St., Providence, R. I.

IMMEDIATELY AVAILABLE

ROLL FORMING MACHINES

Kane & Roach 15 stand, 30" wide, 4½" dia. shaft 75 H.P. M.D.
Yoder 14" stand, 24" wide, 2½" dia. shaft, 25 H.P. M.D.
Tishkin M-2 Ton stand Yoder with AC-2 Cutoff.
Rafter Tube Forming Machines, 5 & 7 Stand.
Yoder 5 stand vertical, with AC-1 Cutoff.

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NEARLY NEW (1948)

GLEASON #7 HYPOID CUTTER SHARPENER. Ser. #24768. Hand Index, Hand Feed. Coolant.

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Phone 37787

ELECTRIC FURNACE TO 1850°

with Auto Temperature Control. Sliding door. Cheap to operate. Substantial Dependable for Machine Shop, Tool Room.

8" x 12" x 15" inside 4.5 K.W. $250.00
12" x 16" x 20" inside 9.0 K.W. $450.00

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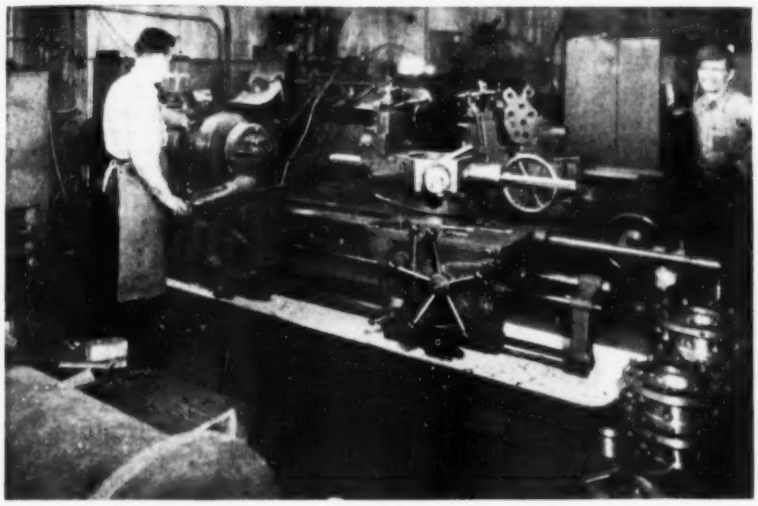

BEHR FACTS:

Milwaukee Crane and Shovel Company, Cudahy, Wisconsin, has found Behrs a reliable source for rebuilt machine tools and industrial equipment. Shown here using a 2L GISHOLT purchased two years ago is operator Paul H. Kott. The machine is still doing an excellent job turning out parts in production.

FIND OUT FOR YOURSELF CHECK THE LIST BELOW:*

LATHES
No. 8 SUNDSTRAND stub, 1941
No. 12 GISHOLT automatic
14 x 30 MONARCH, 1936
14 x 54 MONARCH, 1937
16 x 102" REED PRENTICE, 1941
18 x 48 MONARCH, Ser. #16073, 1942
10' x 10' x 25' SELLERS Planer

TURRET LATHES
No. 2 BARDONS & OLIVER, Elec., BF
No. 2 WARNER & SWASEY, Ser. #48127, 1939
No. 3 GISHOLT Univ. BF, 1941
No. 5 GISHOLT, 1941, Chucker
No. H5 LIBBY, 1940
No. 1L GISHOLT, Cross Slide Turret, Power Chuck
No. 1A WARNER & SWASEY Pre., 1943, BF & CH
No. 2A WARNER & SWASEY Pre., 1942 Power Chuck (2)
No. 3R GISHOLT, 1942
No. 3L GISHOLT Taper Attch. BF, Cross Slide Turrets, 1936

PRESSES
No. 50-5½-84, 48 x 84 Platen, 106 ton
No. 25K BLISS Knuckle Joint, 24 x 24 Platen, 600 Ton

BORING MILLS
No. 30 GIDDINGS & LEWIS 3" Hor. w/2 Aux., Ser. 4806

MILLS
24" BULLARD Vert., 1940, Ser. #16817
No. 2 CINCINNATI, Univ. HSDT, 1943
No. 2 CINCINNATI, Vert. ISDT, 1943
No. 08 CINCINNATI, Vert., Rotary Table
No. 1-12 CINCINNATI
24" x 36" INGERSOLL Duplex, 1942
No. 3-36 CINCINNATI Production
No. 4-48 CINCINNATI Production
No. 2 BROWN & SHARPE Univ., Light Type, 1941
No. 2 MH CINCINNATI, Plain, 1941
No. 12 BROWN & SHARPE Production

GRINDERS
No. 1½ LANDIS Chaser Grinder
No. 22 HEALD Rotary Surf., 1942
10 x 36 NORTON Angular Head. Ser. #16604
14 x 48" LANDIS, Type D, Hyd., 1941, Ser. #21669
Mod. 72A-5 HEALD Int. Surf., Ser. #15279
No. 24-36 BRYANT
6 x 18 Cyl. LANDIS, Plunge Cut, 1943
6 x 30 CINCINNATI, Plunge Cut, 1943
14 x 48 LANDIS Type D, Pl. Cyl.

GEAR MACHINERY
LEES BRADNER Spline Hobber
BARBER COLMAN HRS Hob Sharpener (2)
Type A BARBER COLMAN Hobbers (6)
No. 12 GLEASON Rougher (2) Ser. #19787 & #215790
Mod. 7125A FELLOWS Shaper, Ser. #19713
Mod. Z FELLOWS Shaper, 1943
12" GLEASON Spiral Cutter Sharpener, Ser. #10444

SCREW MACHINERY
1⅞" CONE, 8 spdle., 1942
2" GREENLEE 6 Spdl., 1940
Mod. B 2½" CLEVELAND, Late, 1941
Mod. A 3¼" CLEVELAND, Late, 1942
7½" GOSS & DE LEEUW, 6 Spdl. Aut. Chucker; Work Rotating, 1943
No. 0 INDEX (4)

DRILLS
No. 510 OLIVER Drill Pointer
4' 13" CARLTON Radial, 1939
5' 11" CARLTON, 1941
5' 15" CINCINNATI BICKFORD RADIAL 1941
8' 19" CINCINNATI BICKFORD Radial 1941
No. 2½ ALLEN MS, PF, #3MT
3' 7" CANEDY OTTO Radial, Used
No. 201¼ BARNES, 1948
No. 121 BAKER
No. 321 BAKER
Mod. 242 BARNES #5MT
Mod. H-3 BARNES, Hydram, 1941
6 Spdl. EDLUND, HF, #2MT

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No. 3-24 CINCINNATI Plain Hydromatic Mill, AC-MD

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No. 4 CINCINNATI Hi-Power Vertical Mill, No. 50 taper, power rapid traverse, AC motor

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BORING MILL, 7" bar Niles Floor Type
BORING MILL, 48" Colburn, T Hds., M.D.
BORING MILL, 4½" Bar Niles, Table Type
BORING MILL, 3½" bar Giddings & Lewis #0
BORING MILL, 3¼" Bar Bimsse, Knee Type, M.D.
BORING MILL, 3" bar Lucas, Table Type
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5' Amer., 14" col., Trip. Purp.
5' Niles #10 Rightline, Univ., Motor-on-arm
4'11" col. Cinci. Bick., Lima M.D.
4'12" col. Rocco, New
Nos. 3 & 5 Gisholts, 1942
3'8" & 2½' Arboga (Swedish), Late
TABLES, RADIAL, 36"x20"x20'
DRILLS, #8D Colburn 36", 5" capty.
#3I4 Baker, 24", 3" capty.
24" Cinci. Bick., Tapping, M.D.
#2LMS Leland Gifford, Deep Hole
DRILL, MULTI, 32 spin. W-7 Bausch, 1947
FLANGERS, ½" and ½" McCabe (2)
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GRINDER, SURFACE, 14"x36" P. & W.
GRINDER, SURFACE, No. 33 Abrasive Vert. Spin.
GRINDER, No. 6T Sellers Tool, 1942
GRINDER, 18"x144" Norton Cyl., M.D.
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IRON WORKER, MKIO Pels, punch ¾"x¾", M.D., Late
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24"x12' bed B. & E., T.A., Grd. Hd.
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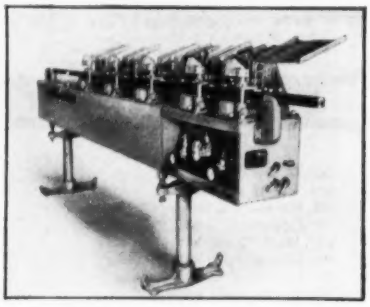

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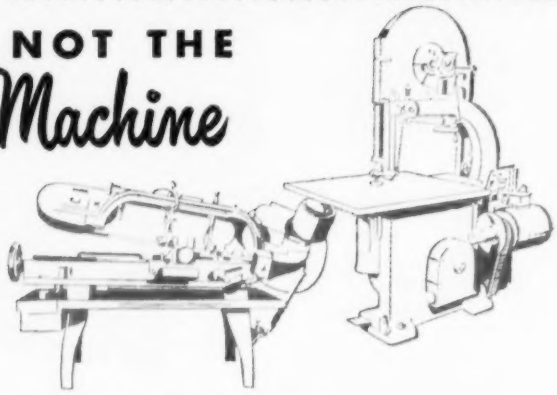

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BE *Sure* YOUR NEW ENGINE LATHE CAN *Take* IT!

The engine lathe you buy today could be the one you will call upon for 'round-the-clock production. Make sure, before you buy, that the lathe of your choice can take such punishment.

ASK ONE QUESTION!

What is the headstock gear arrangement?

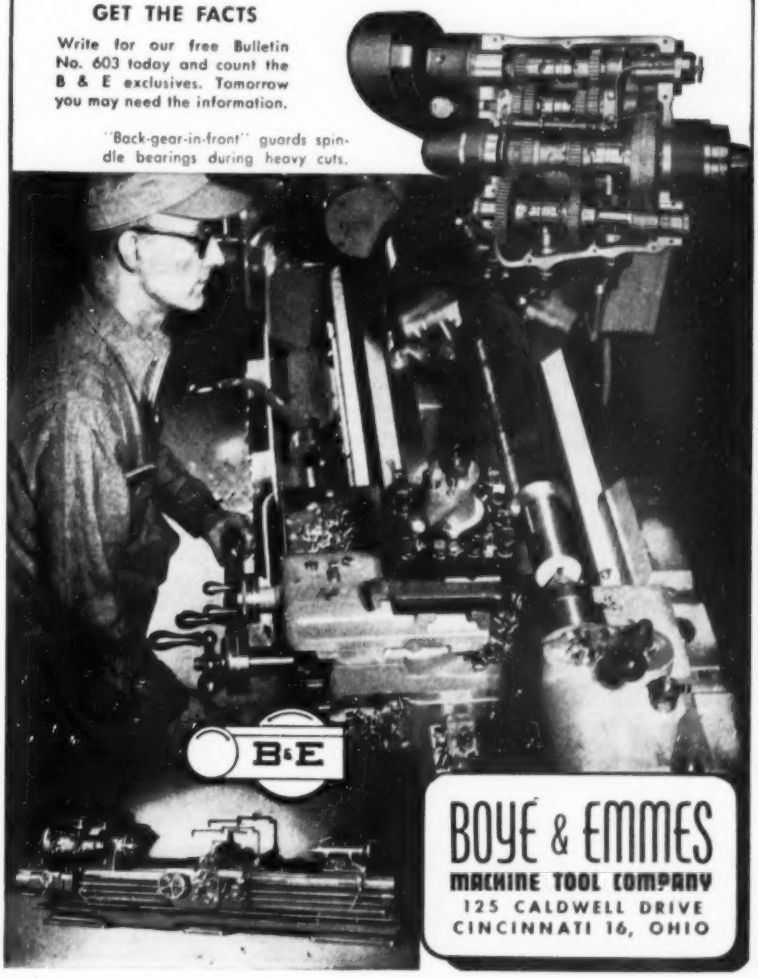
MAKE SURE OF THREE POINTS

(1) That all gears are arranged in a horizontal plane; easy of access.
(2) That gears are in constant mesh, with speed changes effected by means of sliding jaw clutches; eliminating gear wear due to shifting action.
(3) That the "back gear" is in *front* of the spindle, exerting its powerful downward thrust to offset the lifting action of the tool when heavy cuts are made.

On these three points long life for engine lathes depends. At these three points Boye & Emmes Long Life, Heavy Duty Engine Lathes excel.

GET THE FACTS

Write for our free Bulletin No. 603 today and count the B & E exclusives. Tomorrow you may need the information.

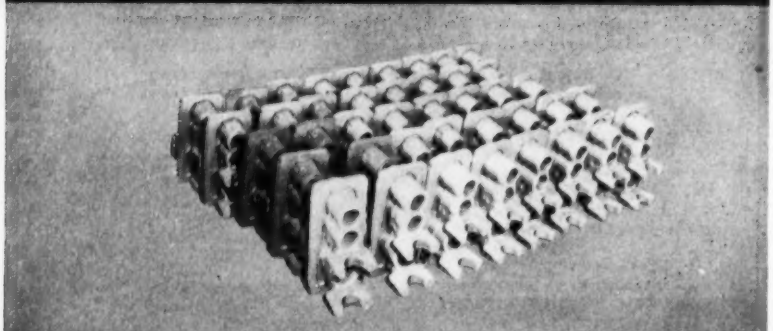


"Back-gear-in-front" guards spindle bearings during heavy cuts.

BOYE & EMMES
MACHINE TOOL COMPANY
125 CALDWELL DRIVE
CINCINNATI 16, OHIO

NEW BALDWIN FACILITIES

MEAN BETTER CASTINGS



AND FASTER DELIVERIES

Now you can save two ways by making Baldwin your regular source for iron and brass castings . . . large or small:

1. You can speed up your production schedules because Baldwin has speeded up casting deliveries 220%. New automatic sand mixing and handling equipment and rearrangement of the pouring operations have enabled Baldwin to increase foundry capacity and at the same time lower casting prices as much as 30%.

2. Baldwin is now able to produce even finer quality castings which cost you much less to finish. This high quality is assured by the uniform machine packed molds, engineered gates and risers, and better control of pouring temperatures. (Note in the upper photo how the molds are arranged so that one tap can be used up before the temperature falls appreciably.)

You, too, can get *quick* deliveries on castings as clean and smooth as the intricate diesel-engine valve guides in the lower photo. For details about the 110 brass and 20 iron alloys available, write Dept. 5702, Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.

BALDWIN · BLH · LIMA-HAMILTON

BALDWIN-LIMA-HAMILTON

Philadelphia 42, Pa. • Offices in Principal Cities

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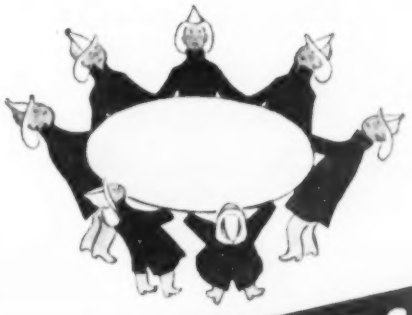
for a fabulous finish...



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Abrasive Belts

for grinding, sanding, polishing — metal, wood, leather, plastics, rubber.

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SPECIFICATIONS—MODEL B

Capacity—5" rounds, 10" flats.
Height Overall—(Closed)—32".
Blade Length—7'5" x ½" x 23 ga.
Floor Space—46" x 28".
Weight—(Uncrated) 235 lbs.
Crated 280 lbs. Boxed for Export 400 lbs.
Wheel Diameters—10".
Motor—⅓" H.P. any voltage available.
Speeds—45, 90 and 150 ft. per min.
Casters—Optional at slight extra cost.

MODEL J

Model J pictured, 10" x 18" Capacity, available as a wet or dry machine. Big, rugged, adaptable to any cutting job.

WRITE FOR DETAILS

JOHNSON MANUFACTURING CORP.
ALBION, MICHIGAN

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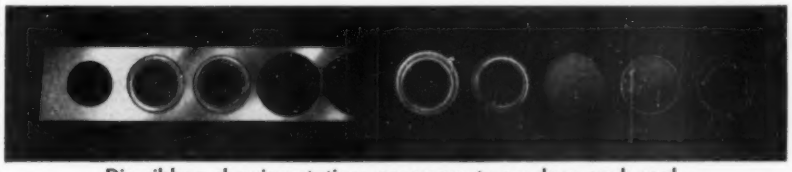
HERE'S ONE SECRET OF AMERICA'S PRODUCTION *Might!*

PRODUCTION B. Jahn PROVED

Progressive Dies Production Proved by B. Jahn! Fluid drive couplings . . . carbine magazines . . . thousands of production components are being produced in tremendous numbers . . . at reduced cost . . . in less time from B. Jahn dies. This ball bearing seal is a typical example of B. Jahn versatility and ingenuity at work.

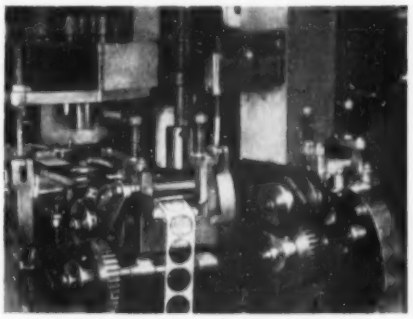
PROBLEM: Build progressive dies combined with dial operation to produce a series of intricate ball bearing seals. Seals consisted of a formed metal ring and neoprene insert assembled into a single unit. All assemblies had to be identical, meet micro-tolerant specifications.



Die ribbon showing stations necessary to produce each seal.

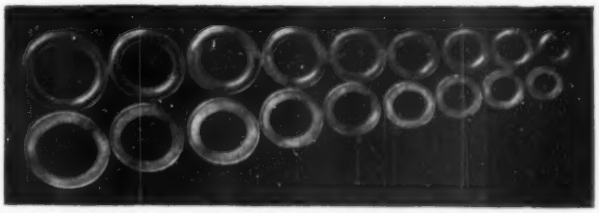
SOLUTION: B. JAHN PROGRESSIVE DIES *Production Proved* to turn out *50 complete units per minute!* All seals were identical — all were perfect. Tools were so designed that with a 3 hour set-up time for each, 9 different sized seals could be produced in the same press equipment.

50,000 ball bearing seals were run for customer's actual assembly line use. Here guesswork, error, costly adjustments were eliminated — here was visual evidence that the die must work in the customer's equipment to his unqualified satisfaction before it was certified "PRODUCTION PROVED" and shipped.



Ball bearing die during pre-test run on customers' equipment. First step of exhaustive tests before die is certified "PRODUCTION PROVED."

YOURS —
Full details on the output-increasing applications of B. Jahn Production Proved Dies — send for this fact-filled B. Jahn brochure TODAY!

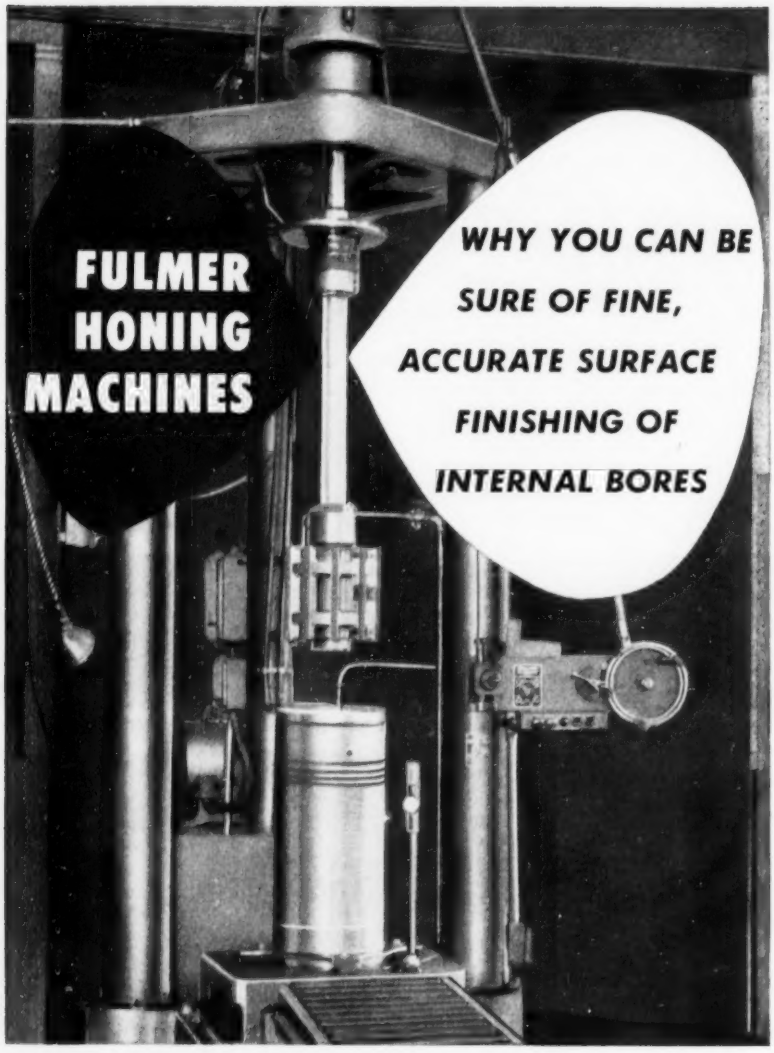


Top and bottom views of nine different seal assemblies.

Investigate B. Jahn — Invest in Production Economy!

B. Jahn

THE B. JAHN MANUFACTURING COMPANY, NEW BRITAIN, CONNECTICUT



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ACCURACY is guaranteed because all surface irregularities are eliminated to tolerances as close as .0001 (±)

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see our catalog in MACHINE TOOL CATALOGS or write for copy

REMOVE AS MUCH AS 1/6 INCH AT 1½ TO 2 CU. IN. PER MIN. for ferrous and non-ferrous metals, glass, plastic, etc.

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C. ALLEN FULMER CO.

105 EAST FOURTH ST. CINCINNATI 2, OHIO

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HOLDING POWER Plus!

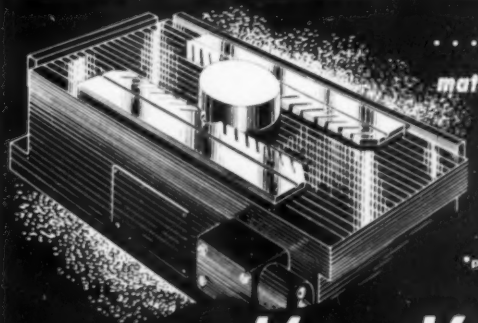
Magna-Lock CHUCKS

Get details . . . Write Dept. AM-53

22% MORE MAGNETIC AREA . . . WORK-PIECES HELD TO EXTREME EDGES OF CHUCK . . . 3 TYPES . . . WIDE SIZE RANGE.

PLASTIC . . . MAGNESIUM . . . FIBRE . . . CARBIDE

. . . other non-magnetic materials CAN BE HELD ON MAGNETIC CHUCKS!



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Magna-Vise* MAKES IT SIMPLE!

Hanchett MAGNA-LOCK CORPORATION

Magnetic Chucks and Devices

BIG RAPIDS, MICHIGAN, U. S. A.

precision *beyond question*

The requirements exacted of surface grinding machines leave no room for variation. Precision and tolerance control must be built-in. Through the years Grand Rapids Grinders have demonstrated the highest quality and unquestioned dependability of performance. Upon this record they have been accorded world-wide acceptance as standard of the industry. Here is precision beyond question.

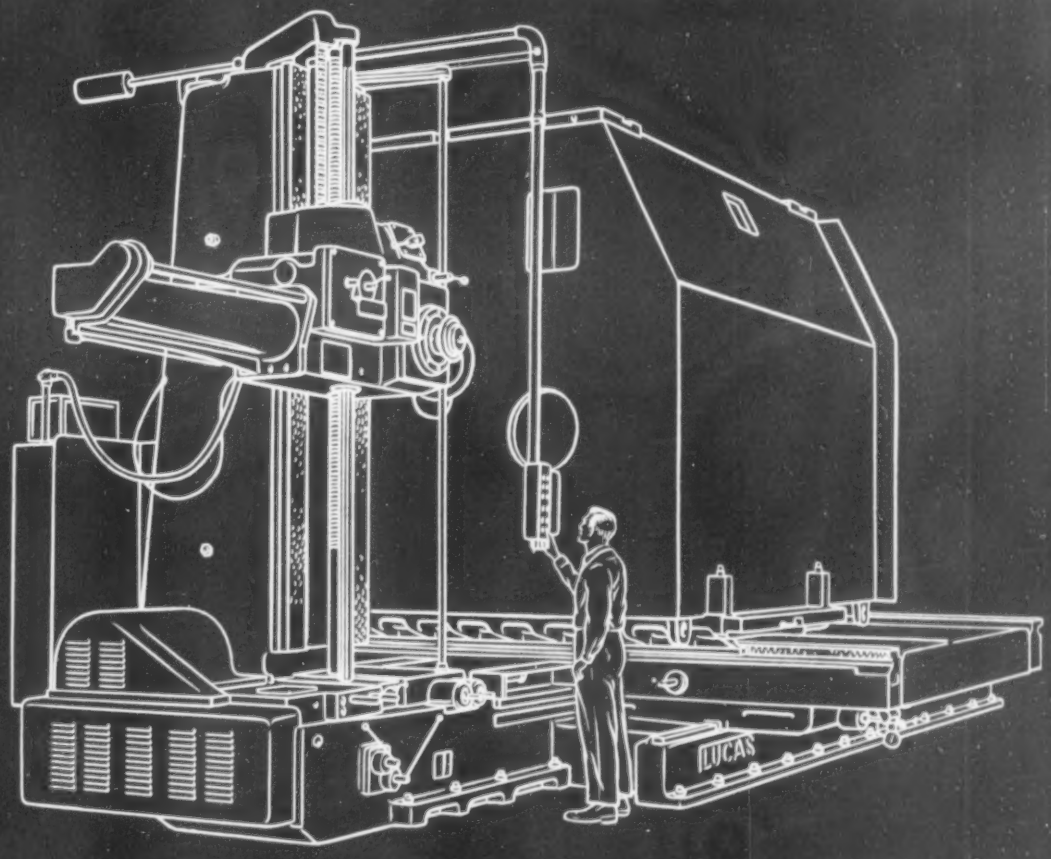
GALLMEYER & LIVINGSTON CO., 200 Straight Ave., Grand Rapids, Mich.

GRAND RAPIDS GRINDERS

GALLMEYER & LIVINGSTON

MANUFACTURERS OF SURFACE GRINDERS, CUTTER AND TOOL GRINDERS, TAP AND DRILL GRINDERS

How big work can you handle on a... LUCAS?



A fifty-ton piece is all in the day's work for a six-inch Lucas Precision. You can machine any piece within 8 feet high by 132 inches wide, and 16 feet long where backrest support is required.

THE NEW BRITAIN MACHINE COMPANY
LUCAS MACHINE DIVISION, CLEVELAND 8, OHIO

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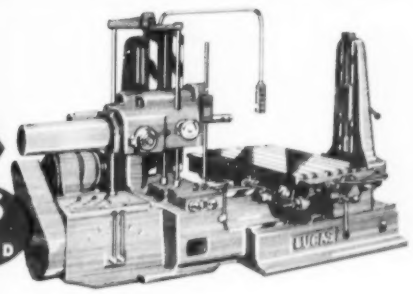
Lucas Horizontal Boring, Drilling and Milling Machines



New Bullard vertical chucking grinder gets high precision, handles heavy loads with table on TIMKEN® bearings

TO insure the high precision needed in finishing cups and cones for large-size roll neck bearings, Bullard mounted the table spindle of a new 64″ size vertical chucking grinder on Timken® tapered roller precision bearings. Timken bearings are also used in many other vital spots.

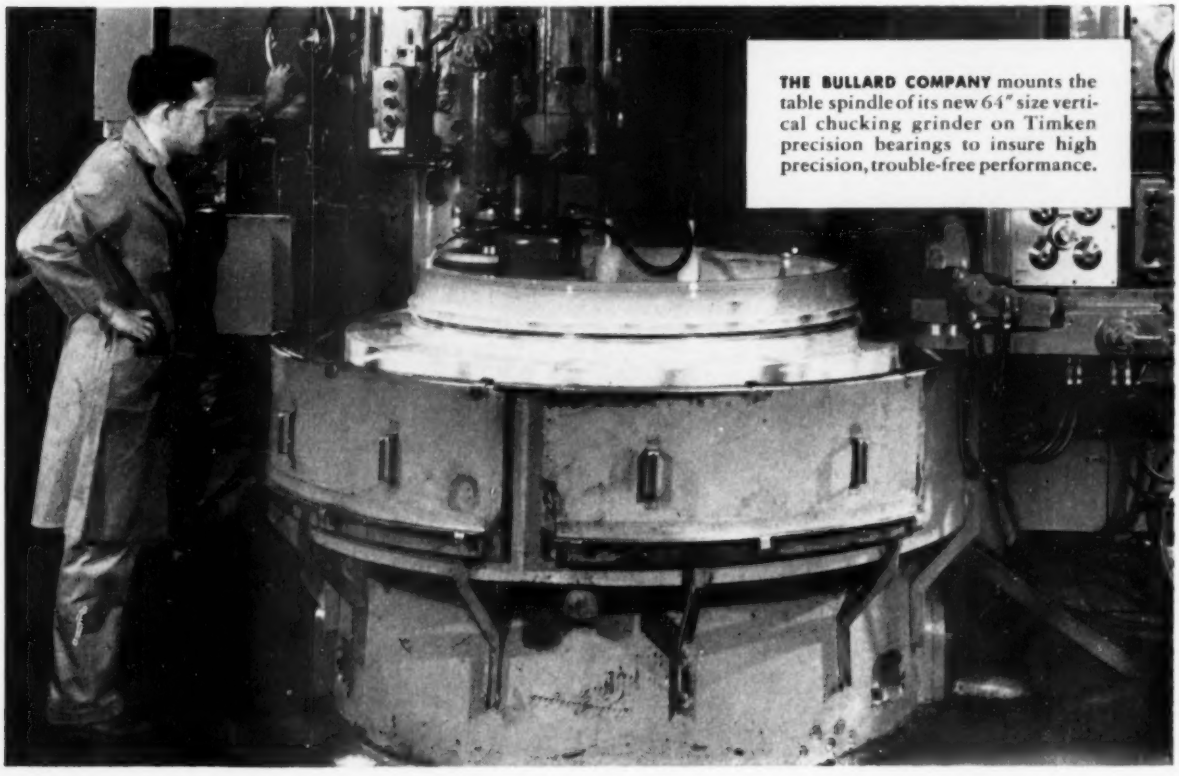
Line contact between their rollers and races gives Timken bearings extra load-carrying capacity. Their tapered construction takes radial and thrust loads in *any* combination. Result: Shafts are held in rigid alignment. Shaft deflection and end-play are minimized. Gears mesh smoothly. Spindle precision is assured.

True rolling motion and an incredibly smooth surface finish make Timken bearings practically friction-free. Maintenance and lubrication time and costs are cut to a minimum.

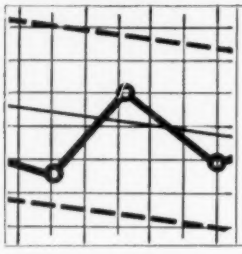
Precision manufactured, made of Timken fine alloy steel and engineered for the job, Timken bearings normally last the life of the machine. Specify Timken bearings in the machinery you build or buy. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED

This symbol on a product means its bearings are the best.



THE BULLARD COMPANY mounts the table spindle of its new 64″ size vertical chucking grinder on Timken precision bearings to insure high precision, trouble-free performance.



STATISTICAL QUALITY CONTROL

To insure uniform high quality and closer tolerances, the Timken Company uses statistical quality control. With it, tolerance deviations are plotted graphically. It's one of industry's newest, most scientific methods of improving product uniformity.

TIMKEN

TAPERED ROLLER BEARINGS

NOT JUST A BALL — NOT JUST A ROLLER — THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION